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Telephony

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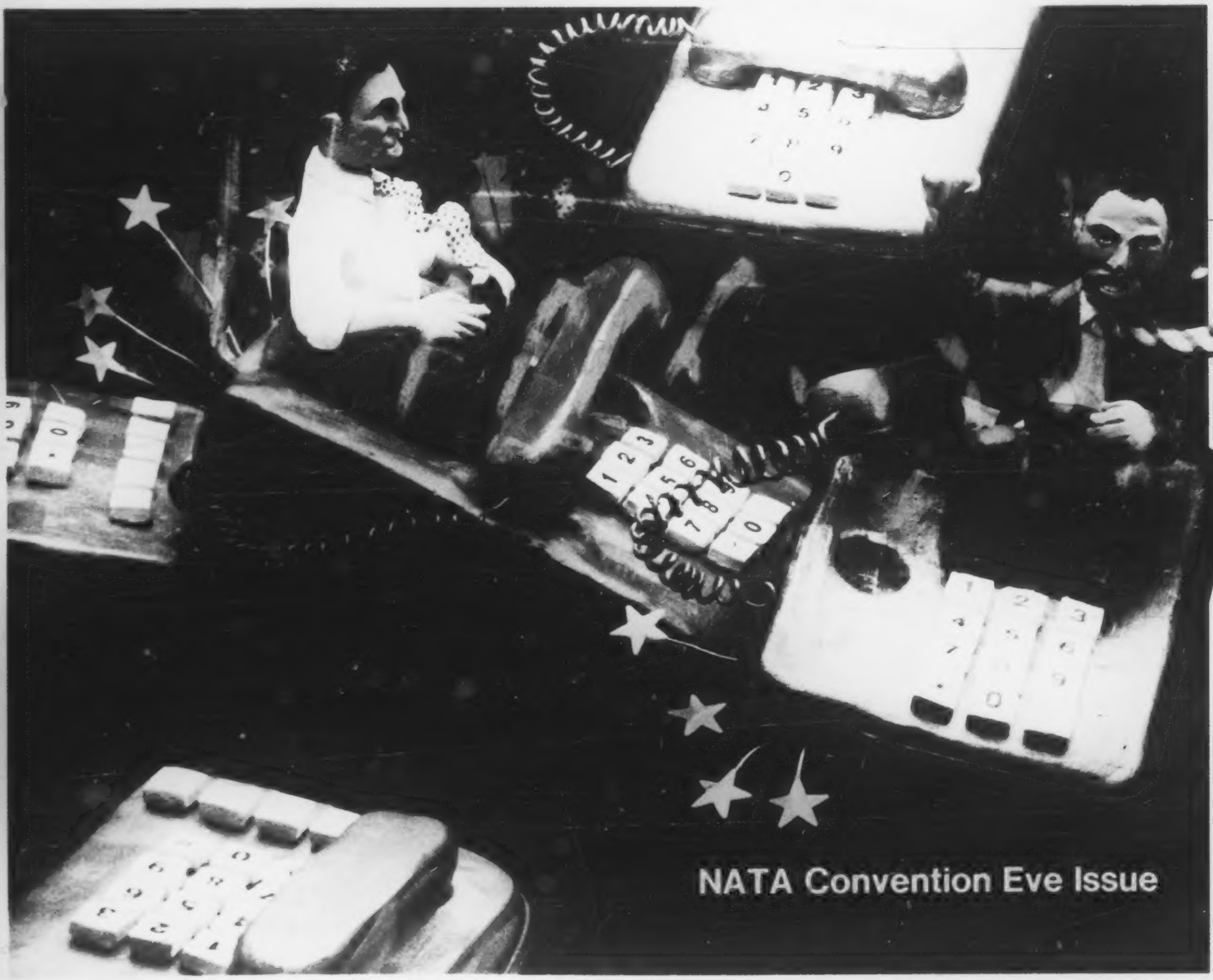
NATA Convention Eve Issue

THE BUMPY ROAD TO ISDN

Five features explore the CPE marketplace

U S WEST RIDES INTO OMAHA WITH MINITEL

This RHC joins the others with a videotex gateway

AT&T, WANG PLAY STANDARD DUET

AT&T continues promotion of ISDN applications and use

MONDAY, NOVEMBER 28, 1988 Volume 215, No. 22

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

NATA Convention Eve Issue

The PBX industry is bumping and lurching toward ISDN as new upgrades become the order of the day. Cover art by Jim Colao

DEPARTMENTS

92 ADVERTISERS' INDEX

6 IN MY OPINION

23 LETTERS

22 MEETINGS

64 MERITS AND MILESTONES

94 MOVING AROUND INDUSTRY

66 NEW PRODUCTS AND SERVICES

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NEWS OF THE WEEK

8 U S WEST RIDES INTO OMAHA
This RHC brings a videotex gateway service, complete with Minitel-type terminals, to this Nebraska city

9 AT&T ROLLS OUT NEW 900 SERVICE
This IXC plans to beat MCI and US Sprint to market with a new interactive 900 service

9 AT&T PLANS STANDARD DUET
Wang is the latest company to join AT&T in its promotion of ISDN applications

FEATURES

26 U.K. PULLS AHEAD IN MOBILE SERVICES
By John Williamson. Once the scorned stepsister of traditional land-line service, mobile telephony is taking center stage throughout Europe

29 WANNA SELL A PHONE SYSTEM?
By Deborah Pfeiffer. PBX and key system buyers weigh different factors before taking the plunge. Here are the results to an in-depth survey examining the variables

36 PBX UPGRADES TRAVEL THE BUMPY ROAD
By Elizabeth Schultz. Without spectacular new products this season, PBX vendors are reaching out for the ISDN brass ring with upgrades of existing lines

41 THE RIGHT STUFF
By Doug Wade. Centel found the key system to meet the growing, bilingual needs of the Dallas Hispanic Chamber of Commerce

47 ON THE ROAD AGAIN
By Stormy Bennett. A growing business sent Van Chevrolet in search of a new phone system. The solution was closer to home than it thought

53 COOPERATE—AND CONQUER
By Al Benoy. Marketing cooperatives have become popular in other industries. Why not the interconnect market?

58 RIDING OUT THE STORM
By Deborah Pfeiffer. The North American Telecommunications Association converges on Dallas this week, where attendees will find a group trying to forge a new identity. If you didn't find the product you were looking for in our product preview last month, a few late entries appear on page 61

Psst! Yeah, you!

Wanna sell a phone system?

According to the results of a survey, PBX and key system buyers aren't after the same thing

DEBORAH PFEIFFER, Assistant Editor

What makes or breaks a phone system sale? It depends on whether the company is looking for a PBX or a key system. PBX users buy technology. Key system users buy price and basic functionality.

Last month, Focus Research Systems, West Hartford, Conn., interviewed 100 people who either had bought a PBX or key system in the last six months or were planning to buy one in the next three months. The purpose of the study was to find out what factors, features and sales techniques influence phone system buyers. Out of the 100 respondents, 68 were PBX buyers and 32 were key system buyers. The following conclusions are based on that research.

PBX buyers are more interested in high-tech. They want to buy a product that won't become outdated or obsolete overnight. And they want to talk with experts before they buy.

Specifically, the most important factors influencing PBX buyers in their purchase decision are system adaptability, expanda-

continued on page 30

bility and features. In addition to basic features, these buyers want integrated voice-data capabilities. They also said that conversations with technical support people play a major role in their decision-making. And they look to telecom managers and other techies inside their company to recommend a system.

Key system buyers are another breed. They are looking for a system that functions well. Period. They don't need or particularly want frills. What they do want is a product that will work, one they will be able to use *after* they buy it. So they look for a manufacturer that will back its product.

The survey's results makes this apparent. For key system buyers, features aren't as important—although conference calling and automatic callback are required basics—as are low price and seller support. Most say the sales technique most influential to their purchase is "references" or "technical information." Unlike PBX buyers, key system buyers solicit recommendations from office managers or administrative managers—the people who probably will use the system most.

More Details? Read On

Those interviewed were asked four questions about the factors, features and sales techniques influencing their purchase decision. Another two questions focused on who recommends and authorizes actual purchases. Respondents were asked to rate the factors of the first four questions as extremely important, very important, somewhat important, not very important and not important at all.

So what factors are important in deciding to purchase a phone system? Both PBX and key system buyers rated all six factors—system features, competence of sales person, seller support, seller reputation, system adaptability/expandability and lowest price—from somewhat to extremely important (Table 1). But for PBX buyers, system adaptability/expandability was extremely important, while features, seller support and seller reputation came in a close second.

On the other hand, the majority of key system buyers value seller support and seller reputation, followed closely by the competence of the sales person, and the lowest price.

What They Want

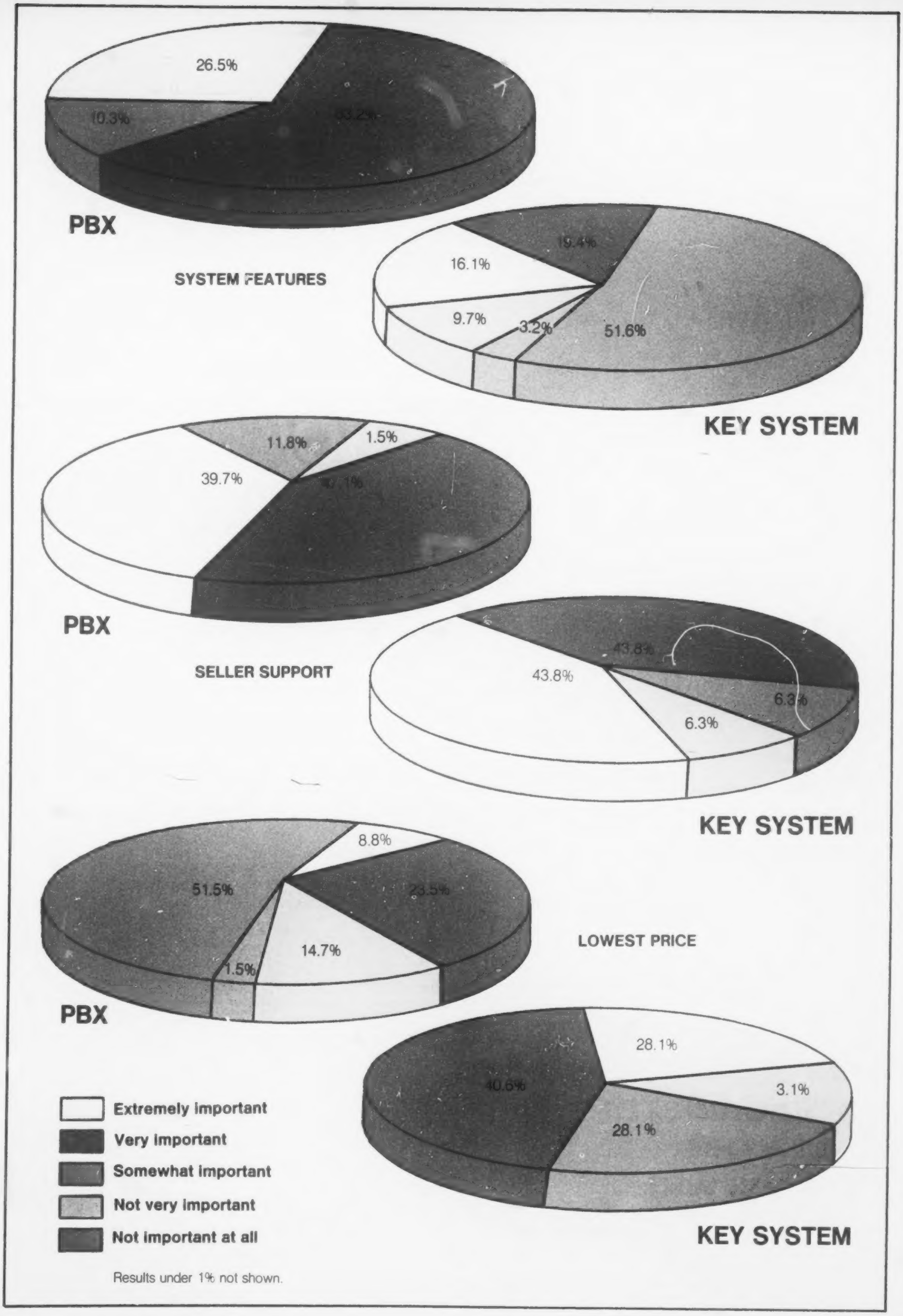
Both PBX and key system buyers stressed conference calling and automatic callback as important system features (Table 2). Voice messaging and electronic mail surprisingly did not grab the limelight from either side. Integrated voice-data capabilities drew enthusiasm from PBX buyers but only disinterest from the majority of key system buyers (see close-up at right). Outside of the polled features over 10% of the PBX buyers were looking for least-cost routing as were some key system buyers.

PBX and key system buyers alike admit to being influenced by most sales tools and techniques used. The techniques specified included promotional brochures, technical information (such as spec sheets or documentation), telephone contact and quick follow-up, face-to-face meetings with a sales person, conversations with

continued on page 35

TABLE 1 IMPORTANCE OF FACTORS IN PHONE SYSTEM PURCHASE DECISION

[illegible]	[illegible]	[illegible]
Extremely important	26.5%	16.1%
Very important	63.2	19.4
Somewhat important	10.3	51.6
Not very important	0.0	9.7
Not important at all	0.0	3.2
[illegible]		
Extremely important	5.9	18.8
Very important	42.6	53.1
Somewhat important	42.6	21.9
Not very important	5.9	6.3
Not important at all	2.9	0.0
[illegible]		
Extremely important	39.7	43.8
Very important	47.1	43.8
Somewhat important	11.8	6.3
Not very important	1.5	6.3
Not important at all	0.0	0.0
[illegible]		
Extremely important	23.5	43.8
Very important	58.8	40.6
Somewhat important	16.2	12.5
Not very important	1.5	3.1
Not important at all	0.0	0.0
[illegible]		
Extremely important	51.5	21.9
Very important	38.2	21.9
Somewhat important	8.8	40.6
Not very important	1.5	15.6
Not important at all	0.0	0.0
[illegible]		
Extremely important	8.8	28.1
Very important	23.5	40.6
Somewhat important	51.5	28.1
Not very important	14.7	3.1
Not important at all	1.5	0.0



Results under 1% not shown.

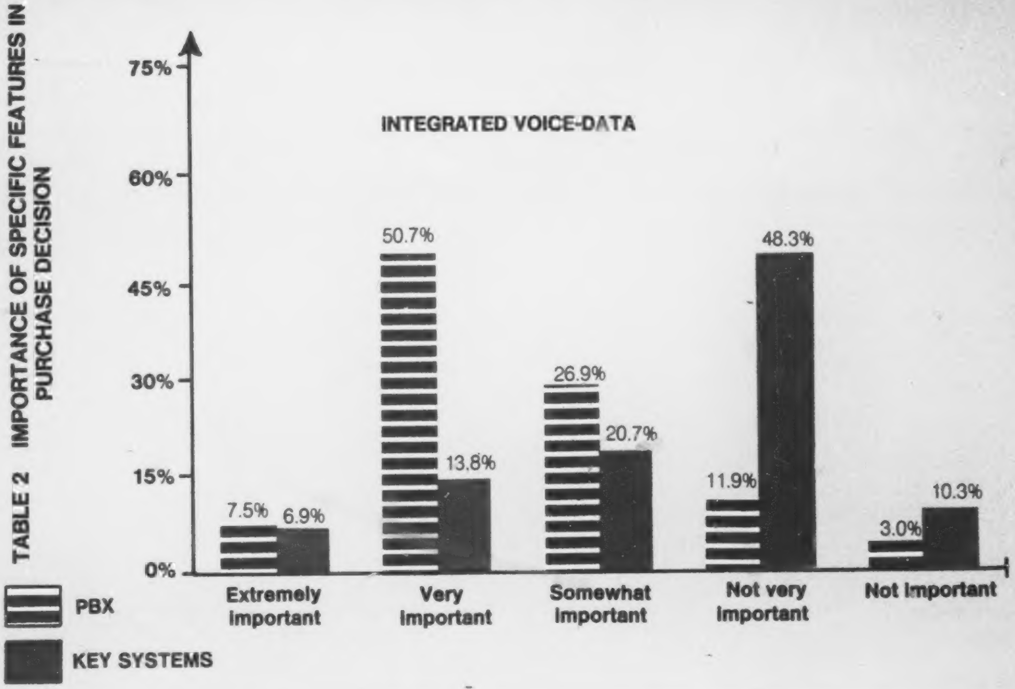


TABLE 2 IMPORTANCE OF SPECIFIC FEATURES IN PURCHASE DECISION

TABLE 2 IMPORTANCE OF SPECIFIC FEATURES IN PURCHASE DECISION

INTEGRATED VOICE-DATA	PBX	KEY SYSTEM
Extremely important	7.5%	6.9%
Very important	50.7	13.8
Somewhat important	26.9	20.7
Not very important	11.9	48.3
Not important at all	3.0	10.3
CONFERENCE CALLING		
Extremely important	16.2	6.3
Very important	50.0	65.6
Somewhat important	29.4	12.5
Not very important	4.4	15.6
Not important at all	0.0	0.0
AUTOMATIC CALLBACK		
Extremely important	23.9	6.3
Very important	53.7	56.3
Somewhat important	19.4	28.1
Not very important	3.0	3.1
Not important at all	0.0	6.3
VOICE MESSAGING		
Extremely important	5.9	3.4
Very important	22.1	6.9
Somewhat important	44.1	24.1
Not very important	22.1	51.7
Not important at all	5.9	13.8
ELECTRONIC MAIL		
Extremely important	1.6	0.0
Very important	11.1	10.3
Somewhat important	54.0	17.2
Not very important	23.8	31.0
Not important at all	9.5	41.4

Who in your organization researches and recommends telephone systems?

PBX	KEY SYSTEM	
27.7%	6.9%	Telecommunications Manager
12.3	0.0	Vice President Data Processing/MIS
13.8	0.0	Manager Data Processing/MIS
1.5	3.4	Vice President/Director/Manager Finance
0.0	24.1	President/CEO
10.8	41.4	Office Manager/Administrative Manager
6.2	6.9	Vice President/Director/Manager Operations
6.2	0.0	Facilities Manager
21.5	17.2	Other

Who in your organization authorizes the purchase of telephone systems?

PBX	KEY SYSTEM	
0.0%	0.0%	Telecommunications Manager
6.3	0.0	Vice President Data Processing/MIS
1.6	0.0	Manager Data Processing/MIS
23.8	10.3	Vice President/Director/Manager Finance
34.9	72.4	President/CEO
12.7	6.9	Board Trustees/Directors
20.6	10.3	Other

Psst! *continued*

technical personnel and references. For 90.9% of PBX buyers, conversations with technical personnel topped the list. Almost as many, 87.9%, wanted technical information. For 84.4% of key system buyers, references were a key issue, followed by 75% who wanted face-to-face meetings.

Regarding what factors are most influential in face-to-face meetings with a sales representative, all of the factors, again, were ranked important by both groups. (The factors offered were honesty/integrity, product knowledge, organization/preparation, presents self well and communicates well.) But honesty/integrity and product knowledge appealed most to both groups.

Who's the Boss?

Finally, respondents were asked who made the purchase decision in their company (see above). For recommending and authorizing PBX purchases, the overall response is mixed; telecom managers stood only slightly above other technical types within the company.

Company presidents, CEOs and owners typically authorize PBX purchases, although they aren't the only ones deciding.

It is easier to find out who to talk to in companies that are interested in buying key systems. Office managers and administrative managers tend to recommend a particular key system, followed by the president, CEO or owner. And the company president, CEO or owner definitely authorizes the key system purchase.

Overall, the two types of buyers aren't just shopping for different items: They're shopping in different stores.

PBX buyers are interested in the technical aspects of a phone system purchase. Key system buyers are looking for the lowest price and the best deal. ◼

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12/15/89

Telephony

AN INTERTEC PUBLICATION DEC. 12, 1988 INTEGRATING VOICE & DATA COMMUNICATIONS $3

OPEN THE BOX AND LOOK INSIDE

In 1988, ISDN became a reality. In '89 comes the evolution

AT&T, US SPRINT CAPTURE FTS 2000

Martin Marietta/MCI left out in the cold

GTE, IBM JOIN ON ISDN

Joint trials will connect private and public networks

4800664*********** 5-DIGIT 20814
A20813----KNNST8000 TIPN
J KENNEDY SRI
CONGRESSIONAL INFORMATION SE -
STE 800
4520 EASTWEST HIGHWAY
BETHESDA MD 20814

MONDAY, DECEMBER 12, 1988 Volume 215, No. 24

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

ISDN providers have given their customers plenty of presents this year, and it's guaranteed that they won't be stashed in some closet. Cover design by Laura M. Doyle; photography by Steve Donisch

NEWS OF THE WEEK

10 AT&T, US SPRINT NAB FTS 2000
AT&T captures a 60% share, US Sprint gets a 40% share and the Martin Marietta / MCI team is left out in the cold in the GSA's multibillion dollar FTS 2000 contract award

11 GTE, IBM PLAN ISDN TRIAL
These two industry giants are conducting joint trials to link IBM's private data network with the public phone network via ISDN technology

11 NORTHERN MAKES COMPETITIVE CUTS
The company is phasing out two North American manufacturing facilities and consolidating other operations

12 ODDS STACK UP AGAINST PLESSEY
A GEC-Siemens takeover seems more probable with the support of Cable & Wireless

12 COBBE TAKES OVER AT STROMBERG
Replacing Ernest Jones, Anthony R. Cobbe picks up the presidential reins at Stromberg-Carlson

FEATURES

26 TSAT TAKES ISDN ANYWHERE
By Tom Miller. A Fortune 500 end user can have companywide ISDN Centrex service, from its hectic urban location to its small, remote locations spread across the states

32 OPEN THE BOX AND LOOK INSIDE
By Michael Warr and Ellis Booker. 1989 will see providers and users unwrap a variety of ISDN applications

46 ACDs ARE FOR EVERYONE
By Ronald M. Heymann. No longer restricted to users with extensive customer call-in centers, automatic call distributors now even make sense for small, local businesses

DEPARTMENTS

76 ADVERTISERS' INDEX
8 IN MY OPINION
25 MEETINGS
78 MOVING AROUND INDUSTRY
54 NEW PRODUCTS AND SERVICES

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Open the box and look inside

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MICHAEL WARR, Technical Editor
ELLIS BOOKER, Features Editor

To: Subscriber
From: [illegible] Corp
To: Subscriber
From: Southwestern Bell Corp
To: Subscriber
From: Pacific Telesis Group
To: Subscriber
From: Bell Atlantic Corp

To: Subscriber
From: U.S. West
To: Sue
From: Telephony
Subscriber

AMERITECH

Illinois Bell **Trials/Customers**	**Access**	**Switch**	**Status**
McDonald's Corp.	BRI	AT&T 5ESS	Serviced by 400-plus lines
Motorola Inc.	BRI	NT DMS-100	Switch to be installed 1st quarter 1989
Bell Labs	BRI	AT&T 5ESS	1200 lines to be installed in 1989
Indiana Bell			
University of Indiana	BRI	NT DMS-100	Selling 50 lines 1st quarter 1990
South Bend	BRI	AT&T 5ESS	August 1988-March 1989 internal
Indianapolis	BRI	NT DMS-100	July 1989-Dec 1990 internal
Michigan Bell			
Michigan Bell	BRI	NT DMS-100	Nov 1988-June 1989
Ohio Bell			
Ohio Bell	BRI	AT&T 5ESS	Nov 1988-June 1989
Wisconsin			
Alverno College	BRI	Siemens EWSD	March 1988-1989

BELL ATLANTIC

C&P of Maryland			
Crievilles, Maryland	BRI	AT&T 5ESS	April 1988 internal
John Hopkins Medical Center	BRI	AT&T 5ESS	July 1988
C&P of West Virginia			
Commonwealth of Virginia	BRI	AT&T 5ESS	April 1988 1000-plus lines planned
West Virginia University	BRI	AT&T 5ESS	January 1989 500 lines planned
C & P Tel			
Federal National Mortgage Association	BRI	AT&T 5ESS	June 1988 400 lines
Bell of Pennsylvania			
Harrisburg, Pa.	BRI	NT DMS-100	November 1988 internal
Philadelphia	BRI	AT&T 5ESS	August 1988
Pittsburgh	BRI	AT&T 5ESS	1st quarter 1989
State of Pennsylvania	BRI	NT DMS-100	contract pending
New Jersey Bell			
Navesink, Bellcore	BRI	Siemens EWSD interworking with AT&T 1A	February 1988 164 lines
Bell Labs, Holmdel, N.J.	BRI	AT&T 5ESS	September 1987 50 lines

BELLSOUTH			
Southern Bell			
AT&T Network Systems	BRI	AT&T 5ESS	March 1988 450 lines
Prime Computer Inc.	BRI/PRI	AT&T 5ESS	April 1988 25 lines/commercial
Sun Trust Service Corp.	BRI	AT&T 5ESS	April 1988 50 lines/commercial
Hayes Microcomputer Products Inc.	BRI	AT&T 5ESS	April 1988 25 lines
Digital Equipment Corp.	BRI	AT&T 5ESS	April 1988
Contel Corp.	BRI	AT&T 5ESS	April 1988 35 lines/commercial
Heathrow	BRI	NT DMS-100	June 1988
North Carolina State University	BRI	NT DMS-100	N.A.
NYNEX			
New York Tel			
Shearson Lehman Hutton Inc.	BRI	AT&T 5ESS	Started June 1988 30 lines
New York City	BRI	NT DMS-100	25 lines/internal
New York City	BRI	AT&T 5ESS	10 lines/internal
New York City	BRI	AT&T 5ESS	10 lines/internal
Tarrytown, N.Y.	PRI	NT DMS-100	2 lines/internal
New England Tel			
Boston	BRI	AT&T 5ESS	75 lines/internal
Boston	PRI	AT&T 5ESS	2 lines/internal
Southern New England Tel			
Aetna	BRI	AT&T 5ESS	Under installation
PACIFIC BELL			
City of Fresno	BRI	AT&T 5ESS	November 1988 100 lines, 700 lines planned First services fall of 1989, completion winter 1990
Chevron Corp.	BRI/PRI	NT SL-100/DMS-100	Being installed, 110 lines
Lockheed Missiles and Space Co. Inc., Hayes Microcomputer Products Inc., AT&T Network Systems	BRI	AT&T 5ESS	September 1987-September 1988 55 lines
Federal Express	BRI	AT&T 1AESS NEAX 61E ISDN Adjunct	October 1988 50 lines

SOUTHWESTERN BELL

AT&T Network Systems	BRI	AT&T 5ESS	January 1987 2300 lines 4th quarter 1988
AT&T Technologies (Oklahoma City Works)	BRI	AT&T 5ESS	July 1988
Rockwell Communications Systems	BRI	AT&T 5ESS	December 1988 1200 lines planned
Shell Oil	BRI	AT&T 5ESS	September 1988 1000 lines, 6000 lines planned for early 1989
Southern Methodist University	BRI	Siemens EWSD	February 1988
3M Corp.	BRI	AT&T 5ESS	April 1988 1300 lines, 3165 lines planned
Tenneco Inc.	BRI	AT&T 5ESS	June 1988 2240 lines, 4240 lines planned for early 1989

U S WEST

U S West Communications

Arizona Department of Transportation, Arizona Department of Administration, Honeywell Bull, U S West Communications (formerly Mountain Bell)	BRI	NT DMS-100	November 1986 - May 1988 200 lines
GTE Communication Systems	BRI/PRI	GTE GTD-5 EAX	January 1987-July 1987
Mountain Bell	BRI	NEAX 61E ISDN Adjunct	February 1987
Intel Corp. Mountain Bell	BRI	AT&T 5ESS	February 1987-August 1987 50 lines
U.S. Bank of Oregon	BRI	NT DMS-100	March 1987-March 1988 200 lines
Control Data Corp.	BRI	NEAX 61E ISDN Adjunct	November 1987-November 1988 200 lines
AT&T Network Systems Denver	BRI/PRI	AT&T 5ESS	September 1988-1995 1000 lines/commercial
AT&T Network Systems Omaha	BRI	AT&T 5ESS	March 1989-1994 100 lines/commercial
3M Corp.	BRI	AT&T 5ESS	July 1988-1994 9000 lines planned/commercial
Boeing Corp.	BRI	AT&T 5ESS	November 1988 1000 lines planned/commercial
Martin Marietta	BRI	AT&T 5ESS	December 1988 25 lines*

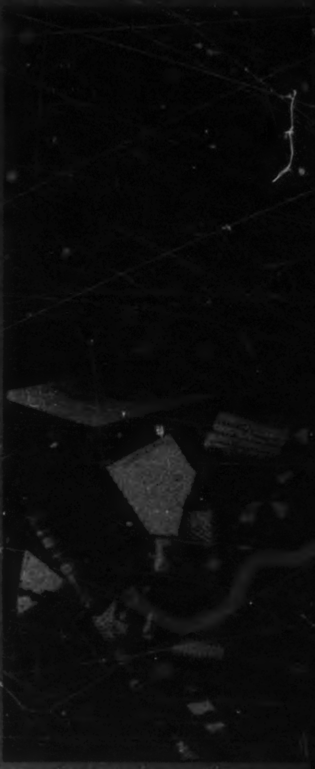
U S West Information Systems Inc.

University of Arizona	BRI	AT&T 5ESS	March 1989

AT&T

Boeing Corp.	BRI	AT&T 5ESS	5000 lines
Merrill Lynch	BRI	AT&T 5ESS	160 lines
Duke University	BRI	AT&T 5ESS	1000 lines by early 1989
Massachussetts Institute of Technology	BRI	AT&T 5ESS	4000 lines
American Express	PRI	AT&T System 85 PBX/4ESS	July 1988
American Transtech	PRI	AT&T System 85 PBX/4ESS	December 1987
First Data Resources Inc.	PRI	NT SL-1 PBX with AT&T 4ESS	N.A.
Lawrence Livermore Laboratory	BRI	AT&T 5ESS	June 1987 16,000 lines
Mather Air Force Base	BRI	AT&T 5ESS	August 1988
McDonnell Douglas Corp.	BRI	N.A.	Unannounced
NASA Legend	BRI	AT&T 5ESS	N.A.

BRI basic rate interface ISDN 2B+D
PRI primary rate interface ISDN 23B+D
* U S West will announce three new ISDN customers in December
N.A. not available



Open *continued*

start the new year with 15,000 combined working ISDN lines, estimates Richard Snelling, Southern Bell's executive vice president-network. Snelling reports that practically every large Southern Bell customer that has issued a request for proposal to the company in the last six months has mentioned ISDN or stipulated that the service provider show "a willingness to provide an ISDN trial." To date, Southern Bell has six declared ISDN customers, and another 17 have agreed to deploy ISDN within the next 12 months, according to Snelling.

Given this interest, Snelling says, "We feel an urgent need to get our service order, installation and maintenance people up to speed."

Total orders for ISDN lines taken by the RHCs as of August 1988 were 43,365, reports the ISDN newsletter The Added Dimension. And Mike Vogel, switching sales support and TriVista director at AT&T Network Systems, says his company will have shipped 200,000 ISDN lines by the end of the year. (Northern Telecom was asked but declined to give a figure.)

Southwestern Bell currently leads the pack with 5000 ISDN lines in service and 18,000 under contract, says David Roe, Southwestern Bell district manager, advanced technology lab. Roe says more ISDN lines are being negotiated for 1989. The company, which developed a reputation after divestiture as the slowpoke among the telcos, achieved its leading edge status in ISDN lines by using ISDN, for now, as a way to upgrade POTS rather than deliver data services.

Pacific Bell, which has the smallest number of ISDN lines deployed, nevertheless envisions cutting over more lines in 1989. "Maybe 10,000 to 20,000," says Steve Mickels, director-ISDN product development.

To date, Pac Bell has orders for 148. The dramatic level of growth Pac Bell expects in one year indicates the optimism shared by the telcos.

Standards

ISDN lines, CPE applications and connectivity mean nothing, however, without standards. Mickels sees the telcos, CO and PBX vendors and applications developers all moving toward CCITT and ANSI standards.

"People are more aware that they cannot maximize entry into the telecom market if they don't standardize," says Mickels. "Europe, Japan and the U.S. all have different standards. The U.S. standards should prevail if for no other reason than the sheer magnitude of the market. The U.S. market is the jewel in the whole ISDN market."

Bruce Becker, vice president-planning at Centel, comments that the CO standards are "pretty locked in" for primary rate ISDN. "Both AT&T and Northern have committed to standards, and I don't see them moving away," he says. Centel is conducting a three-phase ISDN trial in Las Vegas, where it is now turning up two Northern Telecom DMS-100 switches. In the second phase, scheduled for early next year,

continued on page 42

Open *continued*

these two COs will be linked via SS7 over FO lines. "This should be one of the first dual-node field trials," Becker notes. But he and others say a serious shortage of innovative companies developing ISDN applications remains.

Becker is now turning his attention to the PBX and Centrex key system makers, where the norm is proprietary architecture. "This can have some pretty alarming consequences," he says.

By contrast, Southern Bell's Snelling is heartened by the signals he's seen from the CPE vendors. "Northern Telecom and others are talking about 'portability' for ISDN Centrex sets by mid-1989. I feel pretty good about that," he says. Currently Centrex sets are designed to work exclusively with particular CO switches. Even so, the Southern Bell executive states, "We don't plan on filing tariffs until there are standards."

Applications, Demand

Late last month, AT&T announced it was accelerating deployment of the primary rate interface (23B+D) on its network, with planned availability to 62 U.S. cities by mid-1998. AT&T currently offers PRI ISDN in 18 U.S. cities. AT&T's bullishness about ISDN's future is suggested by the fact that the carrier has begun explaining the technology in a TV advertisement.

AT&T is selling two services with its PRI product. An automatic number identification service, which it calls Information Forwarding 2, or INFO-2, presents the calling party's phone number to the customer. The second service, Call-by-Call Service Selection, allows customers to reallocate a single channel for different types of calls—voice or data, incoming or outgoing. The service works with AT&T's Accunet switched digital services, Megacom WATS and Megacom 800 services.

AT&T's PRI ISDN was filed with the FCC in April and commercially available in July. AT&T's first PRI ISDN customer, American Express, gave proponents of ISDN a shot in the arm earlier this year, when it revealed that its INFO-2 application for an 800-type operator service yielded a 17% gain in productivity. AT&T says it has worked with approximately 140 customers on ISDN feasibility and that these customers' demands are dictating the cities to which PRI ISDN will be offered.

On the other hand, US Sprint, which late last month announced 100% conversion to SS7 (*Telephony, Nov. 28, page 3*), will move into ISDN only as the market demands, according to Fred Lawrence, Sprint's executive vice president of network development. Lawrence said at the time of the SS7 announcement that he was still getting mixed signals from the customers about whether they need ISDN yet.

Telco officials for the most part believe next year will bring incremental changes toward wider-scale ISDN. Pac Bell's Jerry Lanich, for one, doesn't see ISDN applications changing much in 1989. Intraoffice connectivity is not possible until SS7 is deployed, so Lanich expects this status quo to remain for another two years.

Randy Friedman, manager-product and service delivery at Bell Atlantic, agrees. Because SS7 will not be ubiquitous, he explains, the network will be restricted to "islands" of ISDN in 1989.

Roe at Southwestern Bell expects significant progress on SS7 access and interworking between ISDN switching systems to have a major impact on ISDN applications and products. Pac Bell's Mickels also sees connectivity as a central issue in '89.

"ISDN is not really creating new applications," says Mickels, "but is instead allowing greater connectivity of the network. As the technology matures, you will have connectivity between LATAs, offices and countries that will allow greater use of the applications."

"This is the year that companies must develop deployment strategies, understand customer demands and get closer to ISDN pricing strategies," he concludes.

But how important is volume at this stage? One of BellSouth's operating companies, Southern Bell, has started delivering ISDN to the home over fiber at Heathrow, Fla., a high-tech residential and business community. And at Globecom '88 Southern Bell's Snelling called on other carriers and vendors, domestically and internationally, to conduct their own Heathrows.

Understanding how the customer will use ISDN is important to selling it, says Joe Cornacchio, staff director-ISDN strategic planning at Nynex.

Accordingly, Nynex is conducting extensive market research on production, price, positioning of the product and promotion. "Market research is developing what those products are and how they will be produced," says Cornacchio. He expects the market research to be completed by February.

"We will not be selling 2B+D to the customer but the services it allows," Cornacchio says. ■

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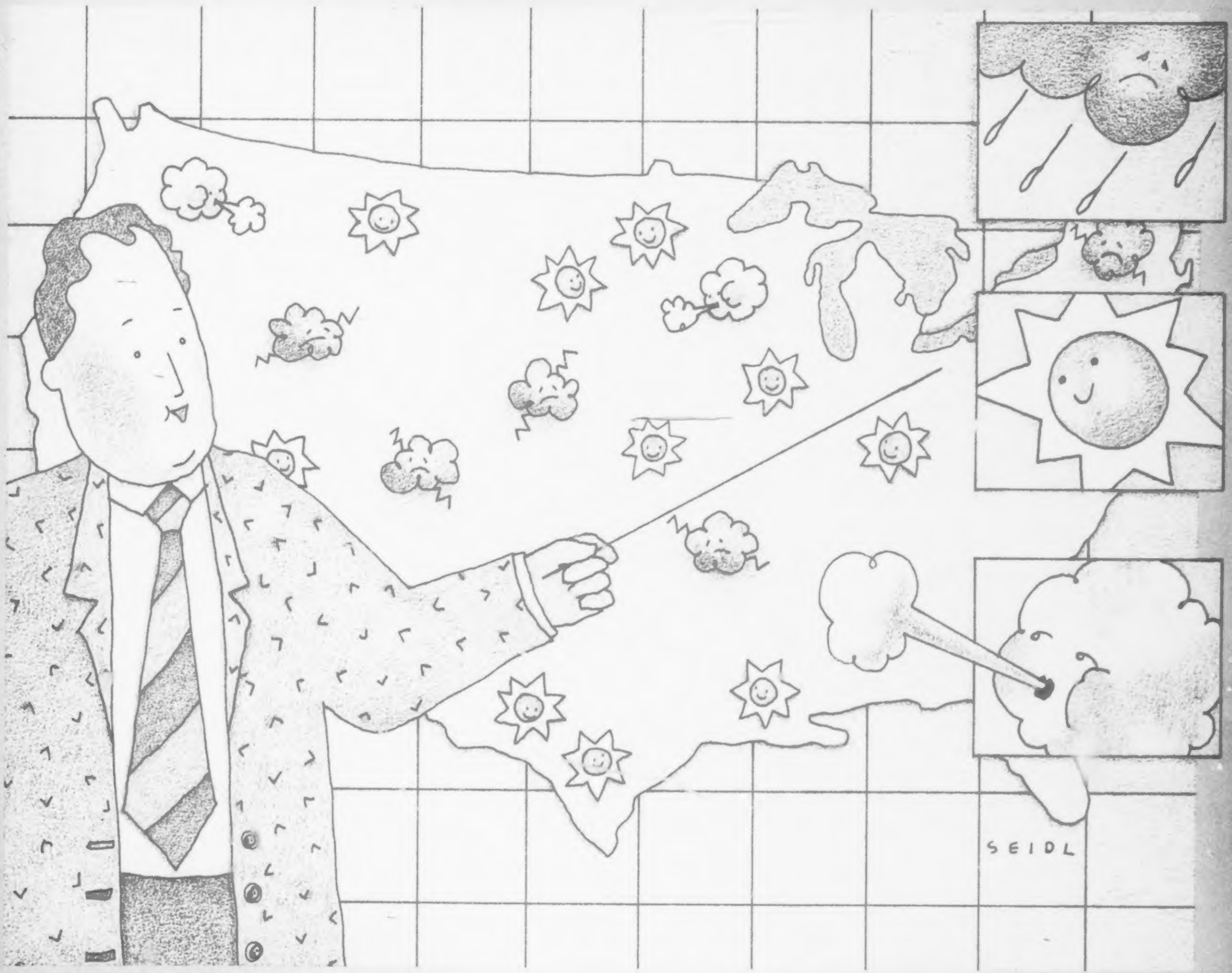
Telephony

AN INTERTEC PUBLICATION JAN. 9, 1989 INTEGRATING VOICE & DATA COMMUNICATIONS $3



$24 BILLION SPELLS SUNNY SKIES

Our Review and Forecast of the LEC industry reveals a slight jump in spending

AT&T DISCOUNTS, MCI COMPLAINS

Long-distance war heats up with SDN price cuts

GTE, AT&T FORMALIZE SWITCHING VENTURE

Execs promise enhanced service for GTE telcos

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MONDAY, JANUARY 9, 1989 Volume 216, No. 2

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

Clouds will cast their shadows over the interexchange carriers this year, while the local exchange carriers bask in the sun. Cover design by Laura M. Doyle; illustration by E. Ann Seidl

DEPARTMENTS

78 ADVERTISERS' INDEX

8 IN MY OPINION

21 MEETINGS

56 MERITS AND MILESTONES

80 MOVING AROUND INDUSTRY

58 NEW PRODUCTS AND SERVICES

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NEWS OF THE WEEK

10 **AT&T PLANS DISCOUNTS, MCI IRKED**
In the latest round of competitive battles between the two long-distance foes, AT&T offers volume discounts for its SDN customers while MCI attacks AT&T's latest competitive tariff offering

10 **AG COMMUNICATIONS SYSTEMS COMES TO LIFE**
AT&T and GTE formally introduce their CO switching joint venture, which their chief executives say will bring enhanced services to GTE's telco customers faster and more cost-effectively

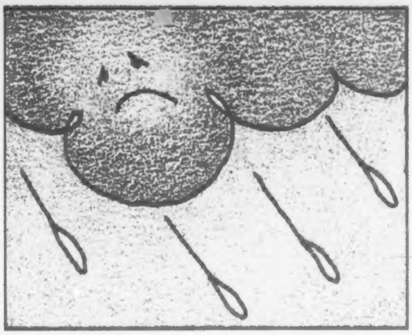
11 **US SPRINT FACES 1989 WITH GLEE**
What a difference a year makes for this long-distance carrier, as it puts the internal problems of the past behind and relishes its share of the massive FTS 2000 contract

12 **PAY PHONE MARKET MAY SHIFT TO CREDIT CARDS**
As equal access comes to the pay phone market, one consultant expects confused customers to rely more on their credit cards than on calling cards from their carriers

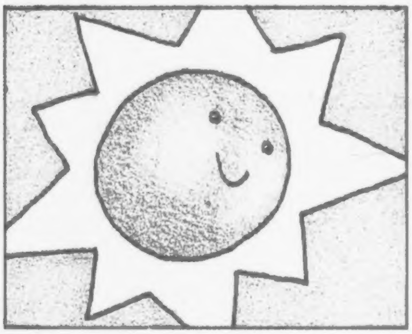
FEATURES

22 **$24 BILLION SPELLS MOSTLY SUNNY SKIES**
By Leo Anderson and Czatdana Inan. Interexchange carriers' expenditures will be down this year and local exchange carriers' up, for an aggregate increase to a modest 0.6%

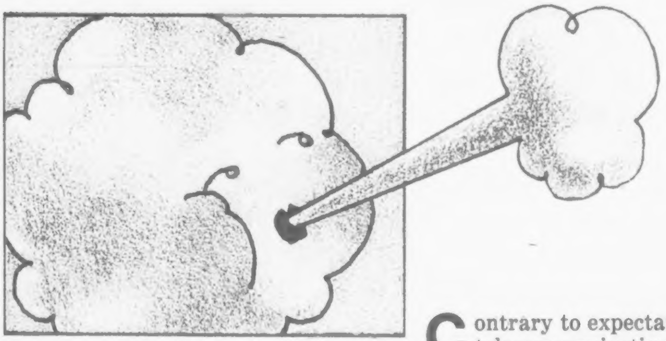
32 **LEC LEADERS SPEAK OUT**
Local exchange carrier executives share their thoughts on what will come to pass in 1989

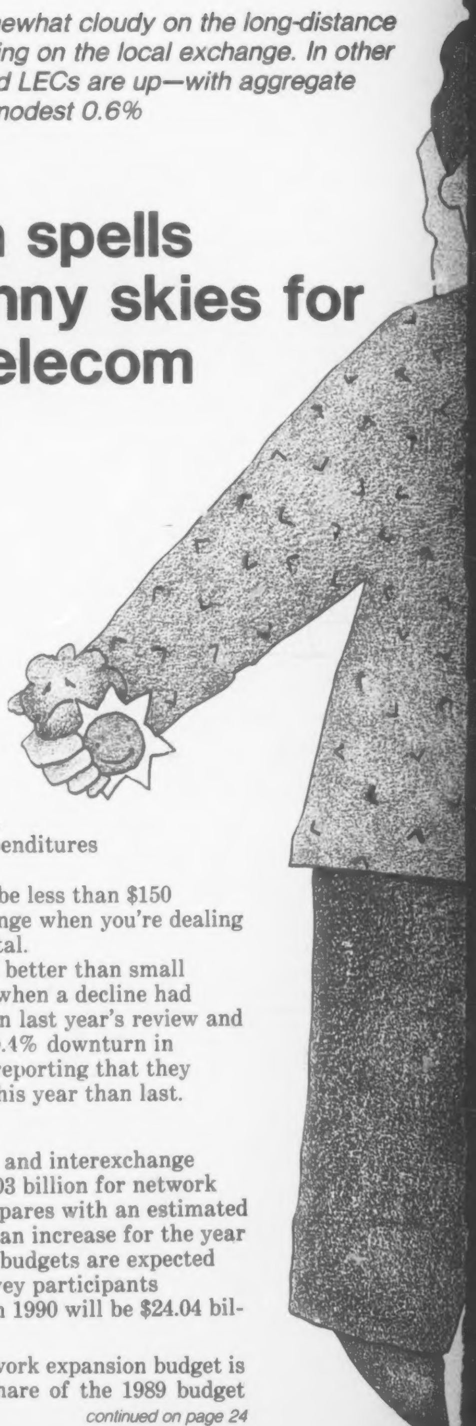


The 1989 forecast is somewhat cloudy on the long-distance plains, but the sun is shining on the local exchange. In other words, IXCs are down and LECs are up—with aggregate increase amounting to a modest 0.6%



$24 billion spells mostly sunny skies for the U.S. telecom industry





LEO ANDERSON,
Publishing Consultant

CZATDANA INAN,
Marketing Development and
Research Director

Contrary to expectations, telecommunications expenditures will edge upward this year.

Even so, the increase will be less than $150 million, and that's small change when you're dealing with a multibillion-dollar total.

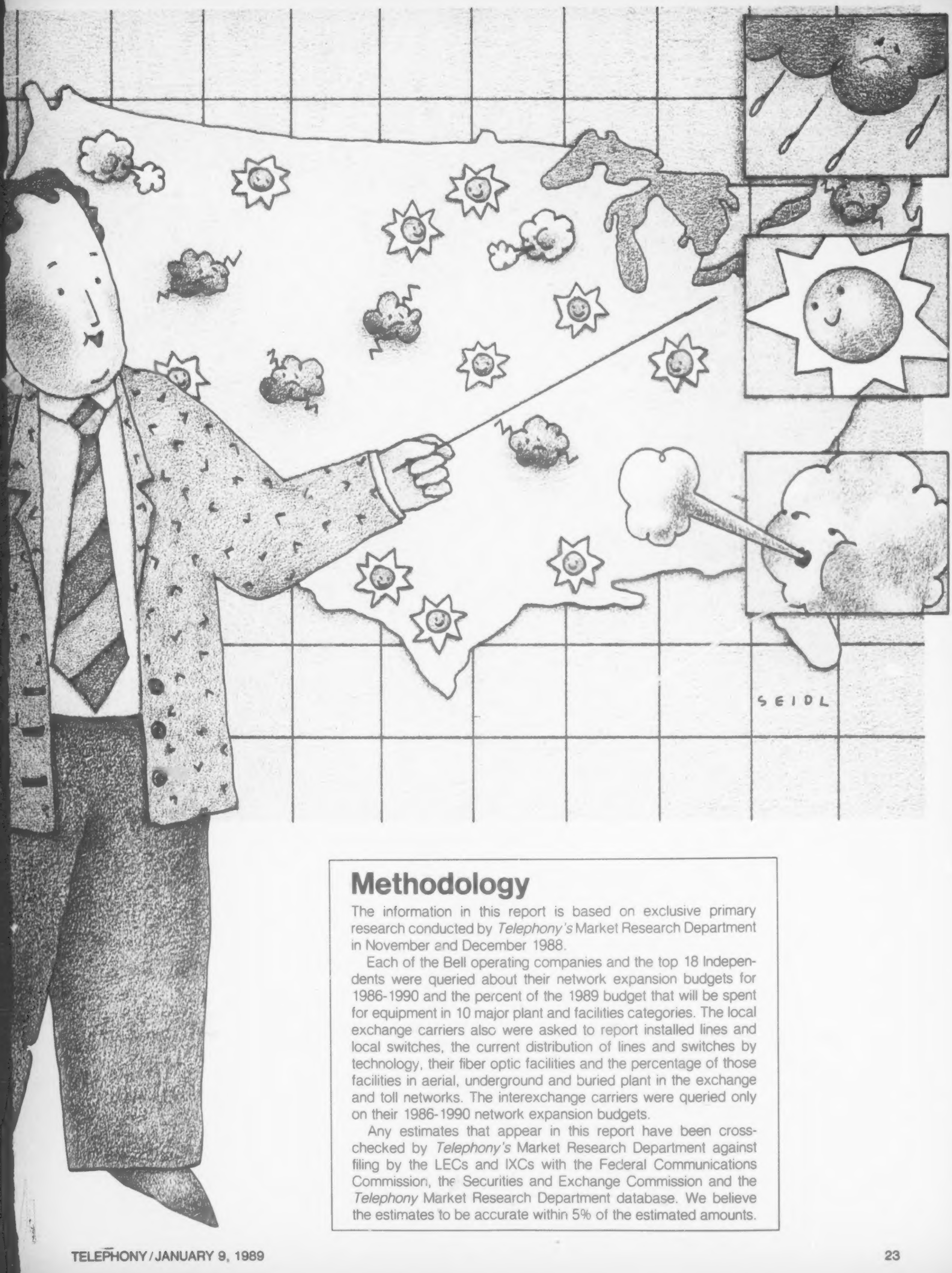
But small change ahead is better than small change behind, particularly when a decline had been expected. Participants in last year's review and forecast survey predicted a 0.4% downturn in 1989. Instead, they are now reporting that they expect to spend 0.6% *more* this year than last.

$24 Billion

U.S. local exchange carriers and interexchange carriers have budgeted $24.03 billion for network expansion in 1989. This compares with an estimated $23.88 billion spent in 1988, an increase for the year of $148 million. Next year's budgets are expected to hold even with 1989. Survey participants predict total expenditures in 1990 will be $24.04 billion.

More than 80% of the network expansion budget is spent by the LECs. Their share of the 1989 budget

continued on page 24



Methodology

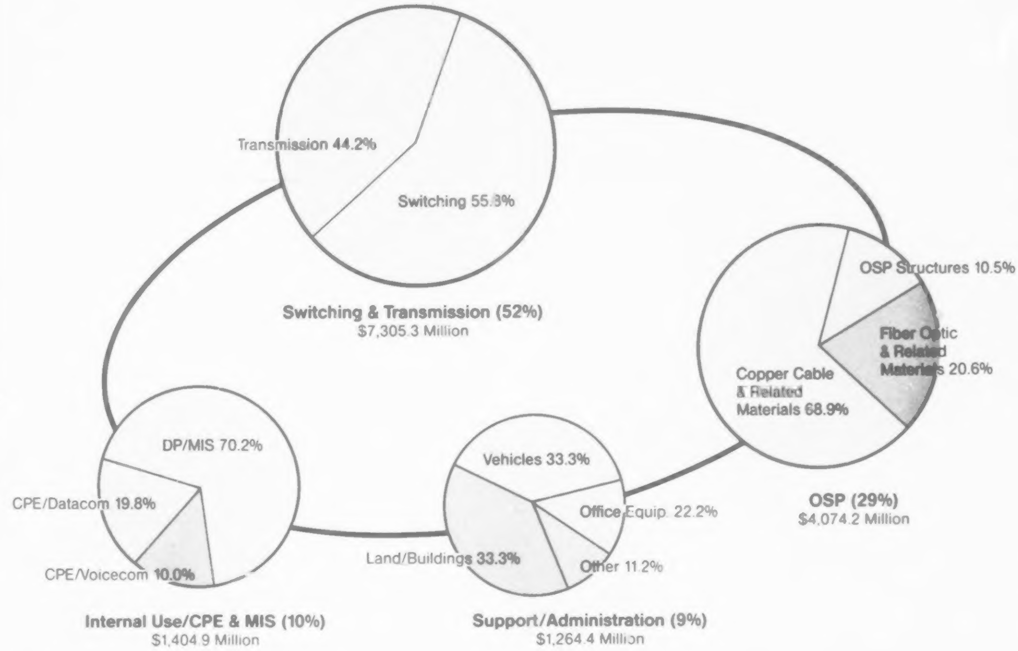
The information in this report is based on exclusive primary research conducted by *Telephony's* Market Research Department in November and December 1988.

Each of the Bell operating companies and the top 18 Independents were queried about their network expansion budgets for 1986-1990 and the percent of the 1989 budget that will be spent for equipment in 10 major plant and facilities categories. The local exchange carriers also were asked to report installed lines and local switches, the current distribution of lines and switches by technology, their fiber optic facilities and the percentage of those facilities in aerial, underground and buried plant in the exchange and toll networks. The interexchange carriers were queried only on their 1986-1990 network expansion budgets.

Any estimates that appear in this report have been cross-checked by *Telephony's* Market Research Department against filing by the LECs and IXCs with the Federal Communications Commission, the Securities and Exchange Commission and the *Telephony* Market Research Department database. We believe the estimates to be accurate within 5% of the estimated amounts.

Figure 1

BOCs' 1989 $14,048.8 MILLION SPENDING



TOTAL BUDGET ($000,000)

52% Switching & Transmission	
Switching	4,074.1
Transmission	3,231.2

29% OSP	
OSP Structures	421.5
Copper Cable & Related Materials	
Aerial	702.4
Underground	421.5
Buried	1,685.9
Fiber Optic & Related Materials	
Aerial	140.5
Underground	280.9
Buried	421.5

9% Support/ Administration	
Vehicles	421.5
Land & Buildings	421.5
Office Equipment	280.9
Other	140.5

10% Internal Use/ CPE & MIS	
CPE/Voicecom	140.5
CPE/Datacom	278.2
DP & MIS	986.2

Source: Telephony/Market Research

Sunny Skies *continued*

is $19.56 billion; the IXCs' share is $4.46 billion. And the IXC budget trend is significantly downward, while the LECs' budgets are heading slightly upward. Looking at recent history, IXC spending hit its peak in 1986, when budgets totaled $5.18 billion (Table 1). Since then it has been at $5.10 billion in 1987, $4.47 billion in 1988 and will drop to $4.46 billion this year, followed by a further drop to $4.4 billion in 1990.

The year of deep pockets for the LECs was 1987, when LEC budgets totaled $20 billion. Budgets dropped to an estimated $19.4 billion in 1988, but are expected to go up this year to $19.5 billion. They will increase again in 1990 to $19.6 billion.

Where Does It Go?

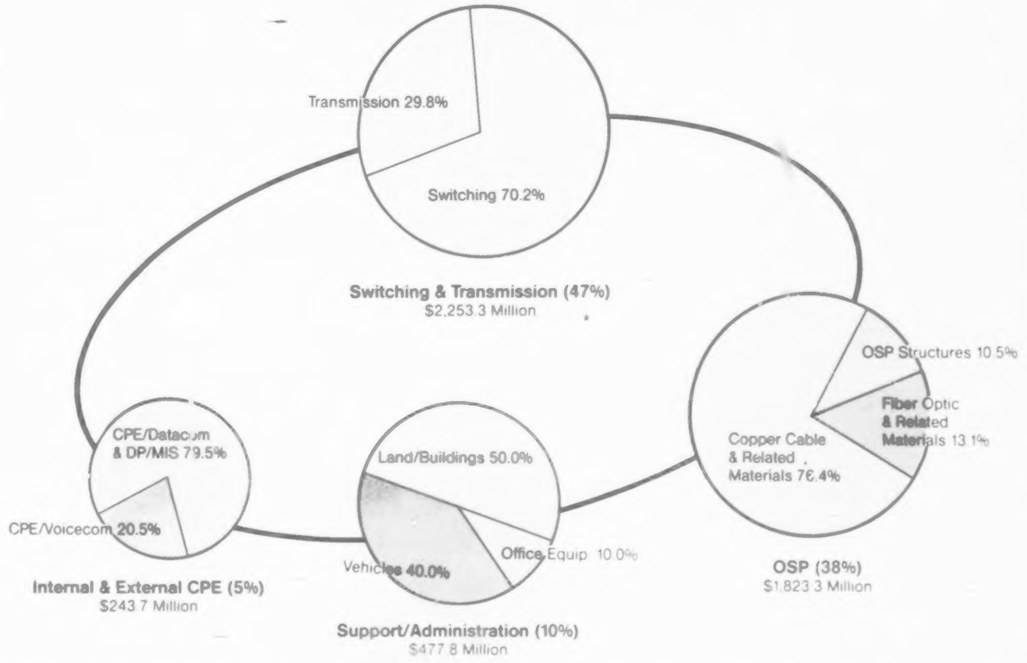
Figure 1 and Figure 2 show how the money will be spent in 1989. The Bell operating companies, which comprise 80% of the total LEC field, will spend 52% of their network expansion budgets on switching and transmission, 29% on outside plant, 10% on customer premises equipment and data processing/management information system equipment, and 9% on buildings and land, vehicles, office equipment and other support systems. The biggest single item in the $14 billion-plus total is $4.07 billion for switching equipment.

Pretty much the same patterns hold true for the 18

continued on page 26

Figure 2

TOP 18 INDEPENDENTS' 1989 $4,798.1 MILLION SPENDING



TOTAL BUDGET ($000,000)

47% Switching & Transmission	
Switching	1,581.4
Transmission	671.9

38% OSP	
OSP Structures	191.9
Copper Cable & Related Materials	
Aerial	383.9
Underground	95.9
Buried	911.9
Fiber Optic & Related Materials	
Aerial	47.9
Underground	47.9
Buried	143.9

10% Support/ Administration	
Vehicles	191.9
Land & Buildings	238.0
Office Equipment	47.9

5% Internal & External CPE	
CPE/Voicecom	49.9
CPE/Datacom	193.8

Sunny Skies *continued*

largest Independent telephone companies, which were studied as a group. Switching and transmission also are big-ticket items in the Independents' budgets, although outside plant and land/buildings/vehicles/office equipment were relatively higher than the BOCs' outlays for these categories, probably because so much Independent territory is rural. As with the BOCs, the largest single item in the Independents' 1989 spending plans is switching equip-

continued on page 29

Table 1

INTEREXCHANGE CARRIER BUDGETS 1986-1990

($000,000)

	Actual 1986	Actual 1987	Projected 1988	Projected 1989	Projected 1990
AT&T Communications	2,556.8	2,659.6	3,000.0	3,000.0	2,900.0*
MCI	980.0	1,000.0	750.0	715.0	650.0*
US Sprint	1,101.0	996.0	625.0	650.0	650.0*
NTN	550.0	450.0	100.0	100.0	200.0
Total:	5,187.8	5,105.6	4,475.0	4,465.0	4,400.0

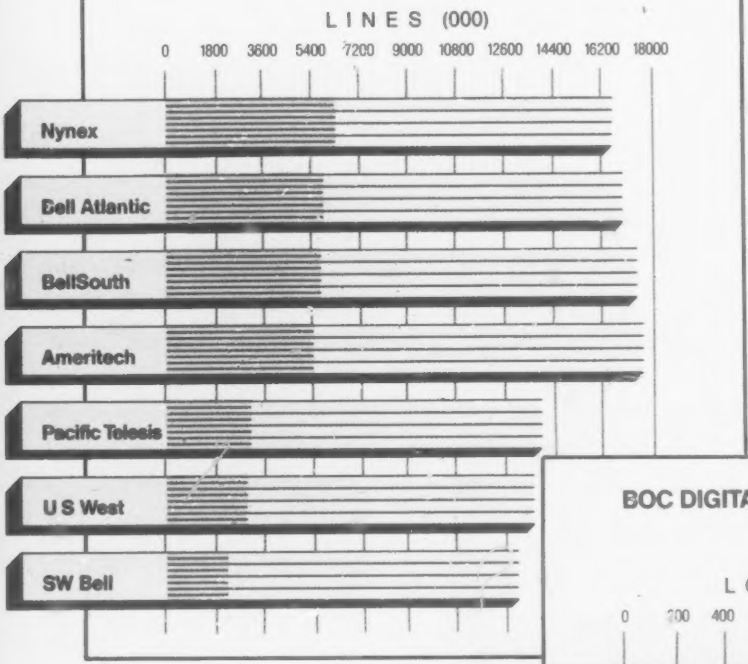
Source: Telephony/Market Research

* estimated by Telephony

Figure 3

BOC DIGITAL LEADERS: EQUIPPED LINES

June 30, 1988



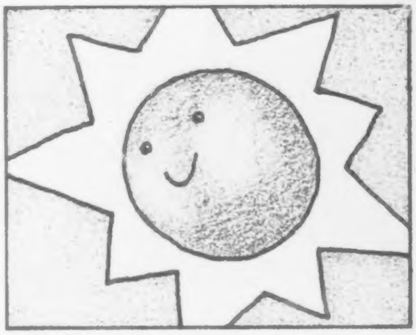
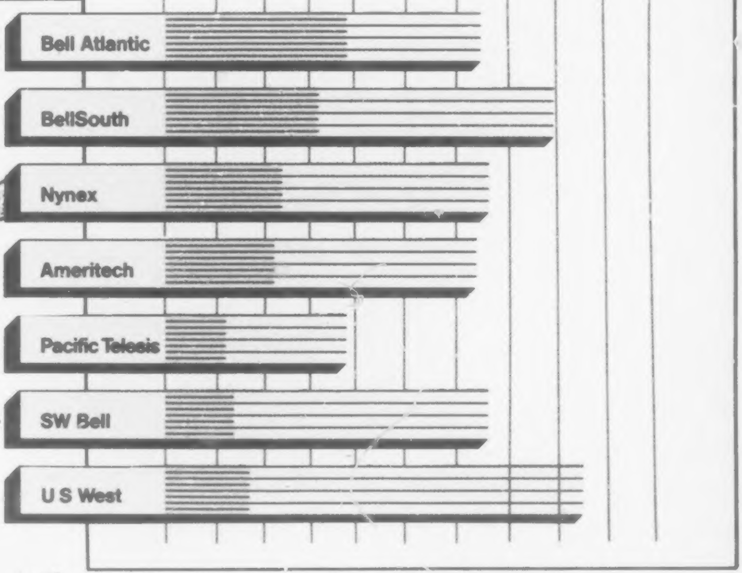
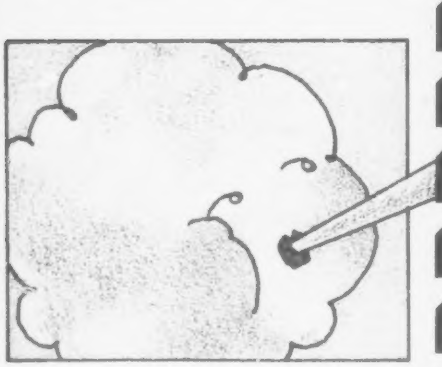


Figure 3A

BOC DIGITAL LEADERS: LOCAL SWITCHES

June 30, 1988





THE BOCs' DIGITAL STATUS: LINES & SWITCHES

June 30, 1988

	Equipped Lines[a]	% Digital	Local Switches	% Digital
Nynex	16,392,000	38%	1,292	56%
Bell Atlantic	16,919,000	35%	1,585	39%
BellSouth	17,515,000	34%	1,323	36%
Ameritech	17,594,000	26%	1,262	36%
Pacific Telesis	13,900,000	23%	744	33%
U S West	13,456,000	22%	1,321	21%
SW Bell	13,017,000	18%	1,706	20%
Total	108,793,000		9,233	

Source: Telephony/Market Research

[a] Total CO line capacity (access lines average 85% of equipped lines)

☰ Number of Local Switches

▤ % Digital of Total

Source: Telephony/Market Research

Sunny Skies *continued*

ment, for which $1.5 billion is budgeted. The aggregate total of all budget items for the Independents in 1989 is $4.79 billion.

No attempt was made to analyze the spending of the rest of the LEC market—some 1000 smaller Independents—since together they spend only about 13% of the Independent total, and only 3.6% of the LEC total including BOCs. It is estimated the 1989 budgets of the small Independents will total $720 million.

The Big Spenders

The biggest spender among the BOCs is Southern Bell, which budgeted $1.9 billion for network expansion this year (Table 2). That's $148.9 million, or 8.4%, over 1988. Not surprisingly, Southern Bell's parent, BellSouth, tops the other six Bell regional holding companies in 1989 spending plans. BellSouth's total budget for this year is $3 billion—which is $156 million, or 5%, over last year.

Four other RHCs—Ameritech, Pacific Telesis, Southwestern Bell and U S West—show spending increases for 1989, but they are more modest. Nynex is down $339 million, a 10% cut. We estimate Bell Atlantic will spend at the same level this year as last—$2.5 billion. And Bell Atlantic will go slightly higher in 1990.

Among the Independents, the largest spender by far is GTE, with a $2.285 billion network expansion budget for 1989, 3.5 times as big as the next biggest budget—United Telecom's $653 million. Despite its magnitude, the GTE budget represents a $43 million, or 1.8%, *drop* from last year.

Taken as a whole, the 18 Independents appear to be on a spending spree. Twelve of the 18 have increased their budgets for 1989, some quite substantially. For example, Cincinnati Bell set its 1989 budget at $102.5 million, a whopping 24% increase over last year. Telephone and Data Systems, the Chicago-based Independent holding company, is up 20%, to $50.6 million for 1989. C-Tec, however, holds the record for the largest increase in spending—with a substantial 30% increase, to $36.1 million.

The other six Independents surveyed reported budget cuts for 1989. United Telecom, like fellow giant GTE, only cut its budget by 1.8%. Another among the top five Independents—Centel—also reported a budget reduction—a substantial 10% cut from $184.9 million in 1988 to $166.3 million for this year. Centel, however, expects to be right back up to $184 million-plus next year.

Taking a closer look at the future, our study shows that three of the seven RHCs—Ameritech, Nynex and Pacific Telesis—predict higher network expansion spending in 1990. We expect level spending at both Bell Atlantic and U S West. And both BellSouth and Southwestern Bell anticipate decreased budgets for 1990.

Only eight of the top 18 Independents expect to spend more in 1990. The other 10 say budgets will be down next year.

IXC Ups and Downs

As indicated earlier, the IXCs hit their spending

continued on page 31

Table 2

LOCAL EXCHANGE CARRIERS' 1986-1990 NETWORK EXPANSION SPENDING

($000,000)

	Actual 1986	Actual 1987	Projected 1988	Projected 1989	Projected 1990
Ameritech					
Illinois Bell	653.5	598.8	588.4	611.4	638.0
Indiana Bell	234.9	223.5	192.7	192.7	200.8
Michigan Bell	531.2	522.9	502.0	506.0	515.0
Ohio Bell	386.2	388.2	365.8	349.8	334.5
Wisconsin Bell	194.8	165.5	179.7	180.0	180.0
Subtotal	2,000.6	1,898.9	1,828.6	1,839.9	1,868.3
Bell Atlantic Network Services					
Bell of PA	696.1	765.2	890.1		
C&P Companies	997.0	1,004.5	978.1		
New Jersey Bell	587.9	594.3	631.8		
Subtotal[a]	2,281.0	2,364.0	2,500.0	2,500.0*	2,550.0*
BellSouth					
Southern	1,695.6	1,823.5	1,761.4	1,910.3	1,895.2
South Central	1,121.8	1,125.9	1,181.2	1,187.8	1,092.3
Subtotal	2,817.4	2,949.4	2,942.6	3,098.1	2,987.5
Nynex					
New York	1,325.5	1,437.7	1,443.7	1,324.8	1,475.8
New England	759.1	869.5	880.0	760.0*	895.0*
Subtotal	2,084.6	2,307.2	2,323.7	2,084.8	2,370.8
Pacific Telesis					
Pacific Bell	1,641.9	1,468.8	1,475.0	1,500.0	1,550.0
Nevada Bell	16.9	26.5	27.0	26.0	27.0
Subtotal	1,658.8	1,495.3	1,502.0	1,526.0	1,577.0
SW Bell Telephone	1,863.8	1,397.8	1,150.0	1,350.0	1,300.0
US West Communications					
Mountain States	883.6	815.6			
Northwestern Bell	403.5	443.0			
Pacific NW	382.7	359.0			
Subtotal[b]	1,669.8	1,617.6	1,582.0	1,650.0*	1,650.0*
BOC Total	14,376.0	14,030.2	13,828.9	14,048.8	14,303.6
18 Largest Independents					
GTE	2,610.0	2,700.0	2,328.0	2,285.0	2,173.0
United	549.6	645.8	665.6	653.4	681.8
Contel	464.6	490.6	553.3	564.6	527.1
SNET	294.9	387.2	326.0*	335.0*	330.0*
Centel	179.2	196.4	184.9	166.3	184.7
Subtotal	4,098.3	4,420.0	4,057.8	4,004.3	3,896.6
Alltel	152.7	151.4	145.0	151.1	153.3
Cincinnati	79.7	91.2	82.6	102.5	92.0
Puerto Rico Tel	162.0	220.0	230.0	160.0*	155.0*
Rochester	85.2	84.2	82.8	92.9	95.5
Century	40.0	37.0	38.0	41.0	34.0
Subtotal	519.6	583.6	578.4	547.5	529.8
TDS	29.8	37.5	42.0	50.6	42.0
Lincoln	27.6	28.4	34.4	35.3	22.7
Pacific Telecom	45.0	37.0	40.4	46.8	44.8
C-TEC	24.9	27.6	27.6	36.1	29.8
Anchorage	33.4	25.9	17.2	9.8	19.8
Illinois Consolidated	13.0	8.0	8.0	7.3	8.0
Citizens Utilities	27.3	33.4	27.3	29.7	30.0
CP National	14.0	13.4	18.5	21.1	23.0
Subtotal	215.0	211.2	215.4	236.7	220.1
Total Top 18 Independents	4,832.9	5,215.0	4,851.6	4,798.1	4,646.5
Bell Operating Co's.	14,376.0	14,030.2	13,828.9	14,048.8	14,303.6
Top 18 Independents	4,832.9	5,215.0	4,851.6	4,798.1	4,646.5
All Other Independents*	725.0	782.0	728.0	720.0	697.0
Total LECs	19,933.9	20,027.2	19,408.5	19,566.9	19,647.1

Source: Telephony/Market Research

* estimated by Telephony

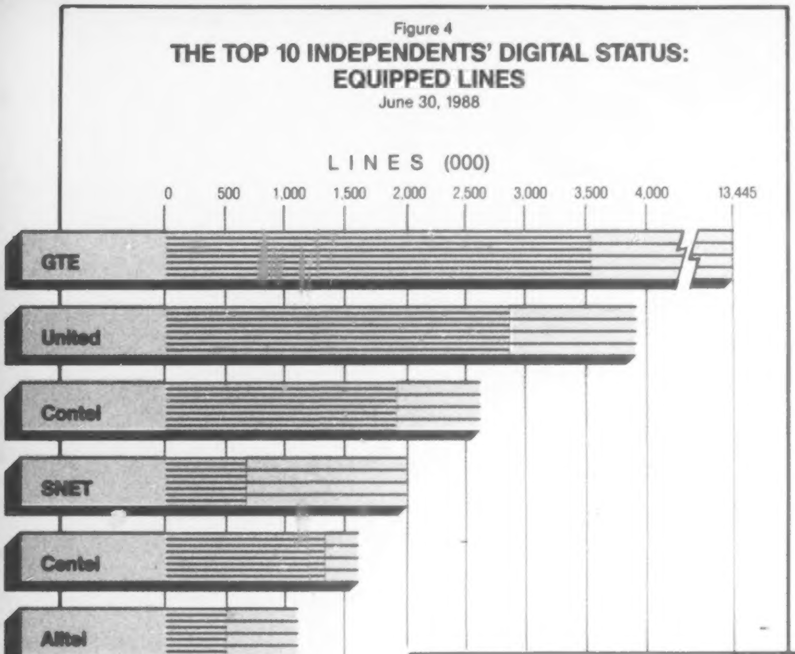
a reported as composite

b merged into US WEST Communications in 1988

Figure 4

THE TOP 10 INDEPENDENTS' DIGITAL STATUS: EQUIPPED LINES

June 30, 1988

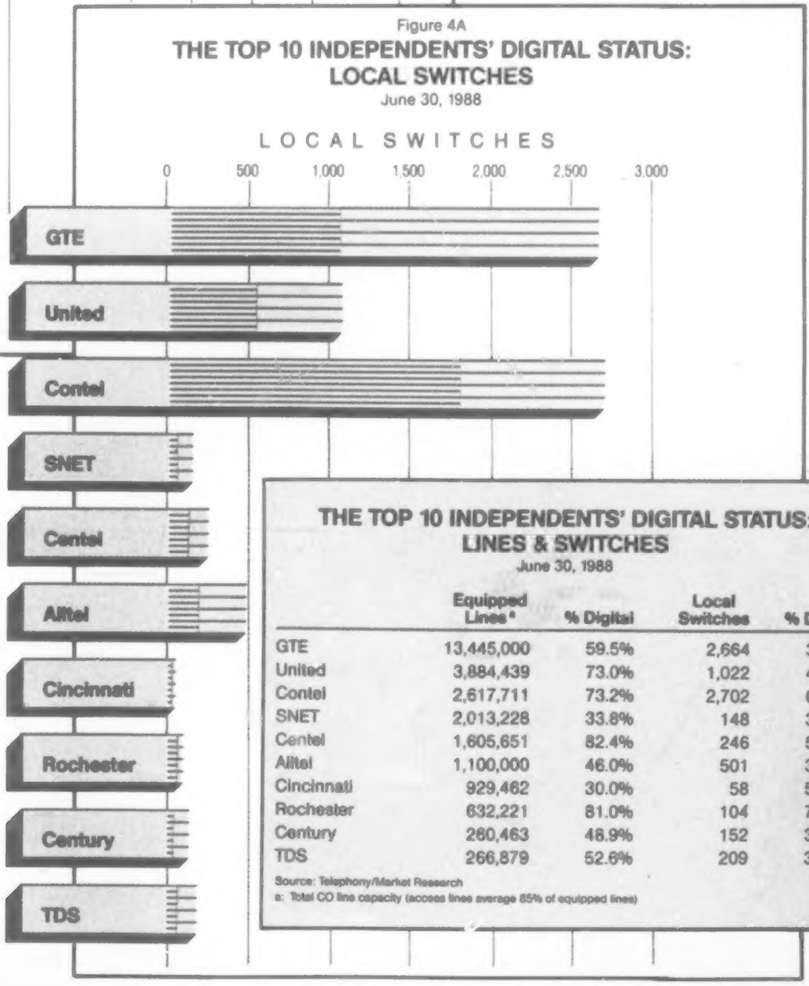


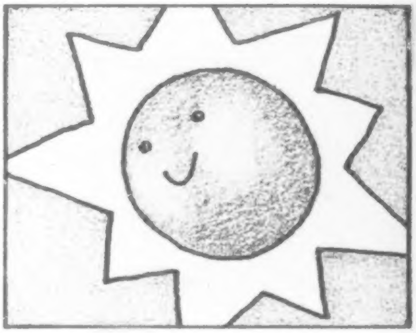
Source: Telephony/Market Research

Figure 4A

THE TOP 10 INDEPENDENTS' DIGITAL STATUS: LOCAL SWITCHES

June 30, 1988





THE TOP 10 INDEPENDENTS' DIGITAL STATUS: LINES & SWITCHES

June 30, 1988

	Equipped Lines^a	% Digital	Local Switches	% Digital
GTE	13,445,000	59.5%	2,664	39.5%
United	3,884,439	73.0%	1,022	47.0%
Contel	2,617,711	73.2%	2,702	67.0%
SNET	2,013,228	33.8%	148	38.0%
Centel	1,605,651	82.4%	246	51.6%
Alltel	1,100,000	46.0%	501	39.0%
Cincinnati	929,462	30.0%	58	50.0%
Rochester	632,221	81.0%	104	70.0%
Century	260,463	48.9%	152	34.4%
TDS	266,879	52.6%	209	34.1%

Source: Telephony/Market Research

a: Total CO line capacity (access lines average 85% of equipped lines)

Sunny Skies *continued*

peak in 1986, principally because of a major drive to convert their networks to fiber optic transmission facilities. Since then their budgets have drifted downward. Our study tracked only the four top IXCs—AT&T Communications, MCI, US Sprint and NTN. Among these, only US Sprint plans to spend more this year—$650 million, a $25 million increase over 1988. The biggest and the smallest of the group are holding steady—AT&T with a $3 billion budget and NTN with $100 million. MCI's 1989 budget is down $35 million from last year, to $715 million.

For 1990, NTN says it will *double* its spending, to $200 million. The other IXCs refused to gaze in the crystal ball. We, however, came up with these estimates: AT&T will spend $2.9 billion in 1990, down $100 million; MCI will spend $650 million, down $65 million; and US Sprint will hold steady at $650 million.

Table 3

FIBER OPTICS: BOC GROWTH IN FIRST 9 MONTHS OF 1988

	Fiber Optic Sheath Miles 12/31/87	9/30/88	% Growth	FO Fiber Miles as of 9/30/88
Ameritech				
Illinois Bell	1,996	2,356*	18%	38,244
Indiana Bell	1,435	1,648	14%	24,773
Michigan Bell	1,597	1,865	17%	55,463
Ohio Bell	977	1,199	23%	22,295
Wisconsin Bell	797	855	7%	22,000
Subtotal	6,802	7,923		
Bell Atlantic				
C&P Companies	2,600*	3,401	31%	109,264
New Jersey	1,057	1,466	39%	41,577
Bell of PA	2,649	3,546*	34%	97,389
Subtotal	6,306	8,413		
BellSouth				
Southern Bell	7,257	9,445	30%	211,805
South Central	4,173	5,022	20%	79,508
Subtotal	11,430	14,467		
Nynex				
New York	2,740	3,376	23%	144,381
New England	2,215	3,300	49%	116,206
Subtotal	4,955	6,676		
Pacific Telesis				
Pacific Bell	2,970	3,564*	20%*	nr
Nevada Bell	64	69*	8%*	nr
Subtotal	3,034	3,633		
SW Bell	5,973	6,905	16%	202,335
US West Comm.	7,021	7,769	11%	123,300
Total	45,521	55,786	23%	

Source: Telephony/Market Research
nr: no report
* estimated by Telephony

The Force

Two major technological innovations—the change from analog to digital switching and the move toward fiber optic cable as the transmission medium of choice have driven LEC spending in this decade.

The Independents were the first to get into digital in a big way. That head start is reflected in the lineup of digital leaders (Figure 4 and Figure 4A). On top is Centel, with 82% of its 1.6 million access lines terminating on digital switches. Contel has about 73% digital lines and United Telecom has 70%.

Among the RHCs, Nynex is the leader of the pack, with about 38% of its 16.4 million lines digital (Figure 3 and Figure 3A). At the bottom is Southwestern Bell, with only about 18% digital lines.

The drive toward fiber optics began in the early 1980s and accelerated fantastically in the last three years (Table 3 and Table 4). As an illustration, in the nine months between Dec. 31, 1987, and Sept. 30, 1988, the amount of fiber optic cable installed at the BOCs increased 23%! At the end of that period Southern Bell alone had 211,805 fiber miles of optical cable in service.

Money is, of course, what makes it happen and network expansion and improvement does not come at bargain basement prices. And that's precisely why the country's LECs will cheerfully lay out $24 billion this year to assure that the forecast for the future is increasingly sunny—with few clouds in sight. ■

Table 4

TOP 15 INDEPENDENTS' INSTALLED FIBER

(September 30, 1988)

	Sheath Miles	Fiber Miles
GTE	nr	95,500
United	3,155	21,454
Contel	9,000	54,000
SNET	639	26,734
Centel	1,079	7,973
Alltel	510	4,100
Cincinnati Bell	209	7,629
Puerto Rico Tel	nr	nr
Rochester	330	3,739
Century	177	938
TDS	250	1,500
Lincoln	415	2,421
PacificTelecom	265	1,816
C-TEC	212	1,601
Anchorage	107	1,806

Source: Telephony/Market Research
nr: no report

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Telephony

AN INTERTEC PUBLICATION JAN. 23, 1989 INTEGRATING VOICE & DATA COMMUNICATIONS $3

EUROPEAN ISDN: PROBLEMS, PROMISES

Once uniformly scorned in Europe, ISDN is now getting some respect

AT&T KICKS OFF NEW SALES STRATEGY

New VP Nacchio pledges creativity, aggressiveness

AT&T ON THE BRINK OF ITALTEL DEAL

Press leaks delay expected announcement

MONDAY, JANUARY 23, 1989 Volume 216, No. 4

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

Once dismissed by European users as a confidence trick devised by manufacturers and PTTs, the integrated services digital network now looks like a legitimate part of Europe's map. Cover art by Laura M. Doyle

DEPARTMENTS

62 ADVERTISERS' INDEX

6 IN MY OPINION

19 MEETINGS

64 MOVING AROUND INDUSTRY

47 NEW PRODUCTS AND SERVICES

NEWS OF THE WEEK

10 AT&T KICKS OFF NEW SALES STRATEGY
Its new sales vice president, Joseph Nacchio, wants a new image for AT&T's long-distance unit, beginning with an ad campaign that debuted during the Super Bowl

10 SOLANA DEPARTS TELEFONICA
The dynamic Spaniard leaves behind a company eager to pursue new ventures but dogged by old service problems

11 STERN AT THE HELM FOR NORTHERN TELECOM
The telecommunications manufacturing giant looks to the U.S computer industry for a new vice chairman, who'll take over when Edmund Fitzgerald retires in 1990

11 AT&T ON THE BRINK OF ITALTEL DEAL
Press leaks appear to have delayed the expected announcement that Italtel has tapped AT&T as its partner in producing equipment for the Italian network

FEATURES

22 HONG KONG INNOVATES WITH PACKET AND FAX
By Euan Barty. Packet switching and fax have provided Hong Kong Telephone with a profitable answer for bringing tariffed services to users that balk at paying for local calls

25 B.C. TEL PUTS AVA ON THE LINE
By Hu Reijne. Since 1987, callers have been receiving directory assistance via automated voice answering, and British Columbia Telephone Co. couldn't be happier

30 EUROPEAN ISDN: PROBLEMS AND PROMISES
By John Williamson. In the last few years, talk has turned to action on the European integrated services digital network front

38 TALKED TO ANY NICE MACHINES LATELY?
By Michael Warr. Vendors and telecom analysts predict good times for voice response, as a plethora of applications are imagined and deployed

42 BEYOND THE OLD FRONTIERS
By Ben Holt. The rosy past of voice processing technology may be indicative of an increasingly bright future

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Talked to any nice machines lately?

Vendors and telecom analysts predict good times for the voice response industry

MICHAEL WARR, Technical Editor

Voice response is one of the most ambitious members of the voice processing family.

Its reach extends to every industry and into government offices and universities as a plethora of applications are imagined and deployed.

Voice response allows users who have digital phones to interact with databases without operator assistance. This saves time and money compared to the normal approach, where users call an operator who accesses a CRT screen and reads the information.

Enthusiasm over voice response technology, combined with U.S. District Judge Harold Greene's decision last March to let the Bell operating companies offer audiotex services, made such an impression that Yankee Group changed its market forecast.

The revised forecast predicts a growth rate in the voice response market of between 35% and 45% per year until 1992.

Yankee Group is not alone in its optimism. Revenues from pay-per-call information services are expected to rise from $443 million in 1988 to $750 million by 1992, indicating a corresponding growth in voice response systems, says Steve Reynolds, research analyst at Link Resources (Table 1).

Most pay-per-call services, such

continued on page 41

TABLE 1 1989 FORECAST OF INTERACTIVE VOICE SERVICE REVENUES
(Dollars in millions)

	1986	1987	1988	1989	1990	1991	1992	CAGR*
Intelligent 800 service revenues	120.0	168.0	231.0	304.9	391.3	491.9	608.8	31
Pay-per-call								
Local (976/970/540)	292.6	316.5	322.8	329.3	325.0	315.0	300.0	0
National (900/700)	35.0	60.0	120.0	110.0	200.0	300.0	450.0	53
Pay-per-call revenues	327.6	376.5	442.8	439.3	525.0	615.0	750.0	14
Voice gateway services								
Talking Yellow Pages								
Operator-assisted services	25.0	30.0	35.0	36.8	38.6	40.5	42.5	9
Talking phone books								
Front of book	0.0	5.0	17.0	30.6	55.1	99.1	148.7	97
Back of book	20.0	40.0	65.0	84.5	126.8	164.8	214.2	49
Subtotal talking phone book	20.0	45.0	82.0	115.1	181.8	263.9	362.9	62
Talking Yellow Pages revenues	45.0	75.0	117.0	151.9	220.4	304.4	405.5	44
Ad supported	5.0	10.0	20.0	40.0	60.0	90.0	135.0	73
Classified ads	0.0	0.0	0.0	1.0	10.0	25.0	50.0	NA
Voice gateway revenues	50.0	85.0	137.0	192.9	290.4	419.4	590.5	51
Voice messaging services								
Service bureaus	58.5	90.0	125.0	150.0	180.0	216.0	259.2	28
Telco/residential	0	0	2.5	25.0	181.4	239.3	300.9	129
Telco/small business	0	0	2.5	15.0	88.8	113.3	140.1	111
Total telco revenues	0.0	0.0	5.0	40.0	270.1	352.6	441.0	123
Voice messaging revenues	58.5	90.0	130.0	190.0	450.1	568.6	700.2	51
Total revenues	556.1	719.5	940.8	1127.1	1656.8	2095.0	2649.4	30

*Compounded annual growth rate for telco voice messaging is for 1989-92 only

Source: Link Resources Corp., November 1988 as weather and entertainment, are accessed via a 900 number. But even 800-based services, which are free, generated $300 million last year—thanks to equipment purchases by the carriers.

Adding to the rising sales of voice response services is the falling entry cost of voice response systems. A system that cost $100,000 nine years ago only costs $30,000 today, according to S. Thomas Emerson, president and chief executive officer of Syntellect Inc.

The most dramatic drop in system prices occurred during the last two years, says Lisa French, an industry analyst at Dataquest. This is largely because of the development of circuit cards that allow operators to run voice response on PCs rather than minicomputers.

The declining cost of chip technology is widening startup opportunities in the industry, notes Reynolds. He says that, with a minor capital outlay, nascent information providers buy a couple of PCs, add voice response circuit boards and offer local network services.

In the business world, the appeal of voice response technology is based, like many other technologies, on the pursuit of lower costs, increased revenues and customer demand.

"Voice response can offer immediate return on money and revenues and increase customer support and services. It is becoming more and more popular," says Dataquest's French.

Multitude of Applications

Triggering the growth of the market are a multitude of applications, French continues.

She notes that billing and account inquiry are common applications. Users can check their bank accounts by phone and even transfer funds. They can access stock quotations 24 hours a day and place investment transactions. With order inquiry, users can pinpoint an order's location and delivery date. And all of these applications are performed without an operator.

French envisions other applications. On university campuses students could enter an account number over the phone and register for classes. They could also check the status of their financial aid, the number of credits needed to graduate and even retrieve messages describing courses.

In the vanguard of voice response applications are the banking and financial, real estate, travel and transit industries. Government applications also are on the rise, say analysts.

Customized Voice

As more diverse industries opt for voice response technology, applications are becoming more customized because users are demanding specialized software.

"For banks there are plenty of software packages," says Reynolds. "The application has been run before, you plug it in and it works."

What about the trucking company with five units spread out across the country that needs a highly customized system?

The need of programmers to develop such customized applications has plagued the voice response industry because only the manufacturer could do the programming. Thus, there is a trend toward menu-driven, user-friendly systems that offer easy modification of applications.

Other trends include more activity by computer vendors. Digital Equipment Corp. already is involved, as are Wang, AT&T and Northern Telecom. Hewlett-Packard and Apple also are developing voice response products, according to French.

Syntellect's Emerson expects to see significant integration of voice messaging and voice response technology. But this, he says, will require a lot of software work.

In addition, Emerson forecasts a continued downward slope in the cost curve and a more aggressive adoption of voice response technology by insurance companies, brokerage houses and financial institutions.

Emerson expects "major telco participation" in voice response services in the next five years, based on pilot installations by Illinois Bell, Bell Atlantic and Southwestern Bell.

"Their entry can only be positive for us," says Emerson. ■

Two Voices

In the voice response world you can have your messages two ways: digitized or synthesized.

Digitized speech is a recording of words and phrases stored in digital form. It is different from synthesized speech, which is text translated into voice and often sounds like the robot in the 1960s science fiction serial, *Lost in Space*. Not surprisingly, users are more comfortable with digitized speech because it sounds more human.

Unfortunately, digitized speech has a limited vocabulary. Although it is acceptable for audiotex, which involves stored messages and predictable vocabularies, it cannot be used to access databases and computer-resident information. Synthesized speech, on the other hand, has an unlimited vocabulary. Vendors and analysts agree that both digitized and synthesized speech are valuable, depending upon the specific application. The wave of the future in voice response systems is toward a combination of both technologies.

Meanwhile, the engineers are working on synthesized speech that sounds as human as Hal the computer did in the movie, *Space Odyssey 2001*.

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Telephony

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NETSYS: A VISION OF THE FUTURE

Pac Bell's Bandler explains the architecture and business strategy

PRICE CAPS ON THE AGENDA

LEC plan may need more work

GREENE REJECTS INTERLATA GATEWAY PLAN

Action could drive up service costs

MONDAY, JANUARY 30, 1989 Volume 216, No. 5

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

With the 1990s looming, Pacific Bell's Michael Bandler, vice president-network technology, talks about his vision of a network and systems architecture for the intelligent network.
Photos by Chris Scott

NEWS OF THE WEEK

8 **PRICE CAPS ON THE AGENDA**
The FCC is ready to act on its much-discussed price-cap plan, but indications are that the LECs are in for more discussion

8 **CELLULAR INDUSTRY EMBRACES TDMA**
Northern Telecom and Ericsson are the big winners as the CTIA chooses the first of several standards needed for digital cellular systems

9 **GREENE REJECTS INTERLATA GATEWAY PLAN**
In his latest slap at the RHCs, the judge nixes use of centralized processors for providing enhanced services to multiple LATAs, a move that could drive up the cost of providing those services

9 **AT&T CLOAKS RATES IN FTS 2000 TARIFF**
Claiming potential competitive harm, AT&T reveals projected revenues and profits for its FTS 2000 contract, but asks to keep its rates secret

10 **NYNEX, AT&T JOIN MAN TECHNOLOGY VENTURE**
Through an alliance with Australian vendor QPSX, the companies will test a new metropolitan area network system for deployment in the early '90s

FEATURES

26 **AC TO DC AND BACK AGAIN**
By Dustin J. Becker. New and old forms of power conversion have special benefits for different telecom applications

32 **BANDLER EXPLAINS NETSYS**
Michael Bandler, Pacific Bell's vice president-network technology, talks with *Telephony's* Technical Editor Michael Warr about Netsys—his company's long-term network and systems architecture plan

38 **POWER POSSIBILITIES**
By Normand Primeau. Here's a look at the power behind integrated services digital network terminals

DEPARTMENTS

62 ADVERTISERS' INDEX
6 IN MY OPINION
23 LETTERS
24 MEETINGS
44 MERITS AND MILESTONES
64 MOVING AROUND INDUSTRY
45 NEW PRODUCTS AND SERVICES

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these proposals benefit the carriers far more than consumers."

The paper, aimed at state legislators and regulatory commissioners, says that the traditional rate-of-return regulatory system has helped to build a superior phone system, while allowing carriers to grow steadily and enjoy "robust financial health."

Changes within the industry may compel changes in regulation, the paper notes. It calls for regulators to seek a balanced approach to implementing such changes, to benefit both providers and consumers. Objective standards need to be found to assess the level of competition within a market, said the ICA. In addition, cost allocation standards need to be in place to prevent cross subsidies, the paper maintains.

In a not always common alliance between major business and institutional users of telecommunication services, the ICA paper was endorsed by the Consumer Federation of America.

CFA Executive Director Gene Kimmelman and ICA President William Pomeroy told a Washington press conference that FCC officials are not correct when they claim that states are rushing to implement price-cap regulation, especially when it applies to local telcos.

OPASTCO votes to accept IXCs

The Organization for the Protection and Advancement of Small Telephone Companies, meeting in Hawaii this month, voted to accept interLATA carriers into the organization. The members also voted to accept state and national associations as members.

OPASTCO said that allowing interLATA carriers into the organization will facilitate the exchange of information and increase the independent telcos' ability to work effectively with long-distance carriers. The new membership categories do not carry voting rights, according to the group. However, representatives will be allowed to serve on committees.

Members also elected Jim Pendergast to serve as president. Pendergast is president of San Marcos (Texas) Telephone Co.

The question of allowing long-distance carriers into the U.S. Telephone Association has also been raised. However, that group has so far resisted the move.

SEL executive jailed for fraud

Peter Purton
Special Correspondent

Helmut Lohr, chairman of West Germany's second-largest telecommunications manufacturer, SEL, was arrested Jan. 18 on charges of tax evasion and fraud. The arrest came days after he had announced his intention to leave SEL to become vice president of mergers and acquisitions for its parent, Alcatel.

Lohr was released on bail of DM2.5 million ($1.2 million). The bulk of the bail money is believed to have been put up by SEL. Police say they were worried he might try to avoid their investigation by fleeing the country to Spain, where Lohr has a holiday home. West Germany has no extradition treaty with Spain.

A former post office engineer, he has been considered one of West Germany's industrial leaders. Early last year, he was set to become the first managing director of Telekom, the government-owned company designed to replace the Deutsche Bundespost as the country's major carrier. Just before Christmas, however, reports emerged that Lohr was under investigation by police for tax evasion and disloyalty to his company.

In mid-January, he announced plans to leave SEL to become vice president of mergers and acquisitions for Alcatel.

Gerhard Zeidler, head of SEL's prestigious laboratory, and a director of SEL and Alcatel, is in line to succeed Lohr. Rumors within SEL indicate, however, that Alcatel's boss, Pierre Suarde, prefers to see someone with less prior association with SEL replace Lohr.

BT to offer VoiceCom service

John Williamson
International Editor

British Telecom and VoiceCom Systems Inc. of San Francisco will offer a new European voice messaging service.

The service, dubbed VoiceCom International, also will provide facilities for businesses with operations on both sides of the Atlantic and, through its use of local dialing rates, could cost only 25% of the price of conventional trans-Atlantic telephone calls.

The two companies will market VoiceCom International under a joint service and marketing agreement in the U.K. and other European countries. VoiceCom, 28% owned by BT, will offer the international voice messaging service to its customers in the U.S. British Telecom and VoiceCom said they already have secured commitments for VoiceCom International service from several customers.

The VoiceCom deal is the first step in a BT plan to establish an international voice messaging network. The service is scheduled to start in early February.

AT&T/McCaw team up for FTS 2000

Although some may think that federal bureaucrats already spend too much time on the phone in their offices, AT&T and McCaw Cellular Communications plan to give them a chance to talk from their cars, as well.

AT&T announced Jan. 23 that it had signed an agreement with McCaw, a cellular phone service company, for a proposed cellular mobile telecommunications service as part of FTS 2000.

AT&T said the additional optional service for FTS 2000 will provide a total communications package for federal employees. Service on the upgraded system is expected to begin late this year, according to AT&T.

Corrections

In *Telephony's* Jan. 9 issue, figures were mistakenly transposed in a table accompanying Figure 3 of the U.S. review and forecast article ("$24 billion spells mostly sunny skies for the U.S. telecom industry," page 22). The table should have reported the number of local switches for Nynex as 1323 (36% digital); for Bell Atlantic, 1291 (56% digital); for BellSouth, 1585 (39% digital); for U S West, 1706 (20% digital); and for Southwestern Bell, 1321 (21% digital).

Due to an editing error, the Jan. 9 issue of *Telephony* also inaccurately reported that British Telecom had changed its position on the prospect of a takeover of Plessey by GEC and Siemens ("Plessey mulls sale of GPT," page 12). The article should have stated that British Telecom remains neutral on the GEC/Siemens bid for Plessey.

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Telephony

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REVIEW & FORECAST

EUROPE ZOOMS WHILE THE WORLD WATCHES

Western Europe increases spending as the rest of the world cuts back

PATRICK TARGETS CAPS FOR JULY

He wants action on AT&T plan, more study for LECs

NEW YORK PSC OPENS LOCAL LOOP

New York Tel gets pricing flexibility in return

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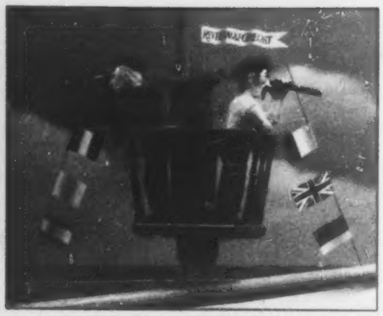
MONDAY, FEBRUARY 27, 1989 Volume 216, No. 9

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



With a projected increase of $3.2 billion this year, the countries of Western Europe are zooming in on telecommunications improvement and growth. Cover art by Jim Colao/David Marine; photography by Kenji Kerins

DEPARTMENTS

62 ADVERTISERS' INDEX
6 IN MY OPINION
19 MEETINGS
64 MOVING AROUND INDUSTRY
44 NEW PRODUCTS AND SERVICES

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NEWS OF THE WEEK

8 PATRICK TARGETS PRICE CAPS FOR JULY
As Congress prepares for its hearings on price caps, the FCC chairman asks for quick action on AT&T and more study of the LEC plan

8 NEW YORK PSC OPENS LOCAL LOOP
In exchange for pricing flexibility, New York Tel must open its network to competitors for high-speed private-line services

9 EUROPEANS MAY RELENT ON TRADE
The newly appointed European Commission commissioner says he'll support telecommunications in the general trade discussions

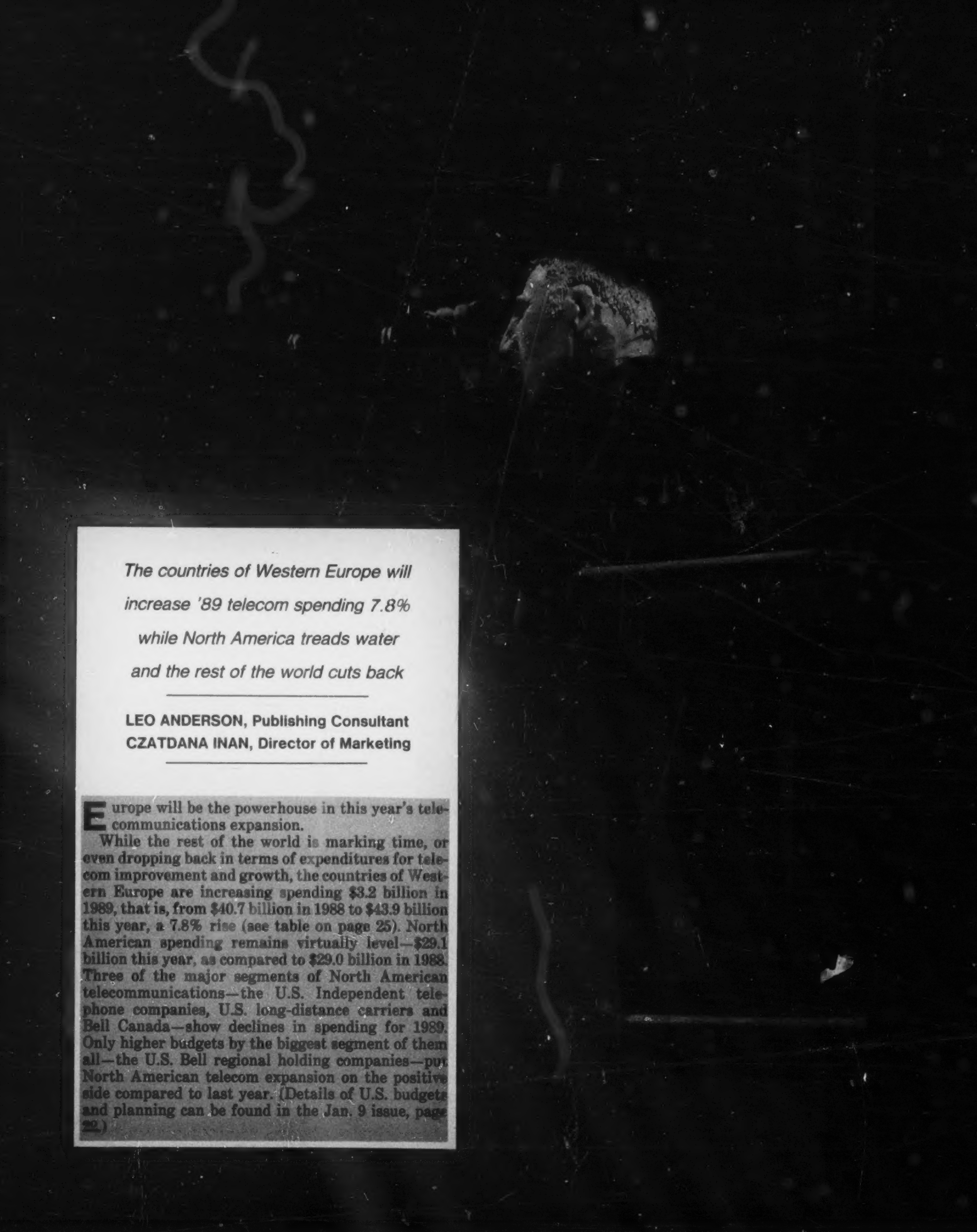
9 EUROPE, SOUTH KOREA NEW TRADE TARGETS
The Bush administration is prepared to invoke the 1988 trade act, if the European Community and South Korea don't change what the U.S. considers restrictive telecommunications trade policies

13 NEW ENGLAND TEL TESTS RAYNET FIBER SYSTEM
"A fiber-to the curb" transmission system will be tested in Lynnfield, Mass., as part of the push to get fiber to the customer's doorstep without compromising quality

FEATURES

20 EUROPE ZOOMS WHILE THE WORLD WATCHES
By Leo Anderson and Czatdana Inan. The countries of Western Europe will increase '89 telecom spending 7.8% while North America treads water and the rest of the world cuts back

28 PTT LEADERS SPEAK OUT
PTT executives the world over speak out about telecommunications issues facing their organizations in 1989



The countries of Western Europe will increase '89 telecom spending 7.8% while North America treads water and the rest of the world cuts back

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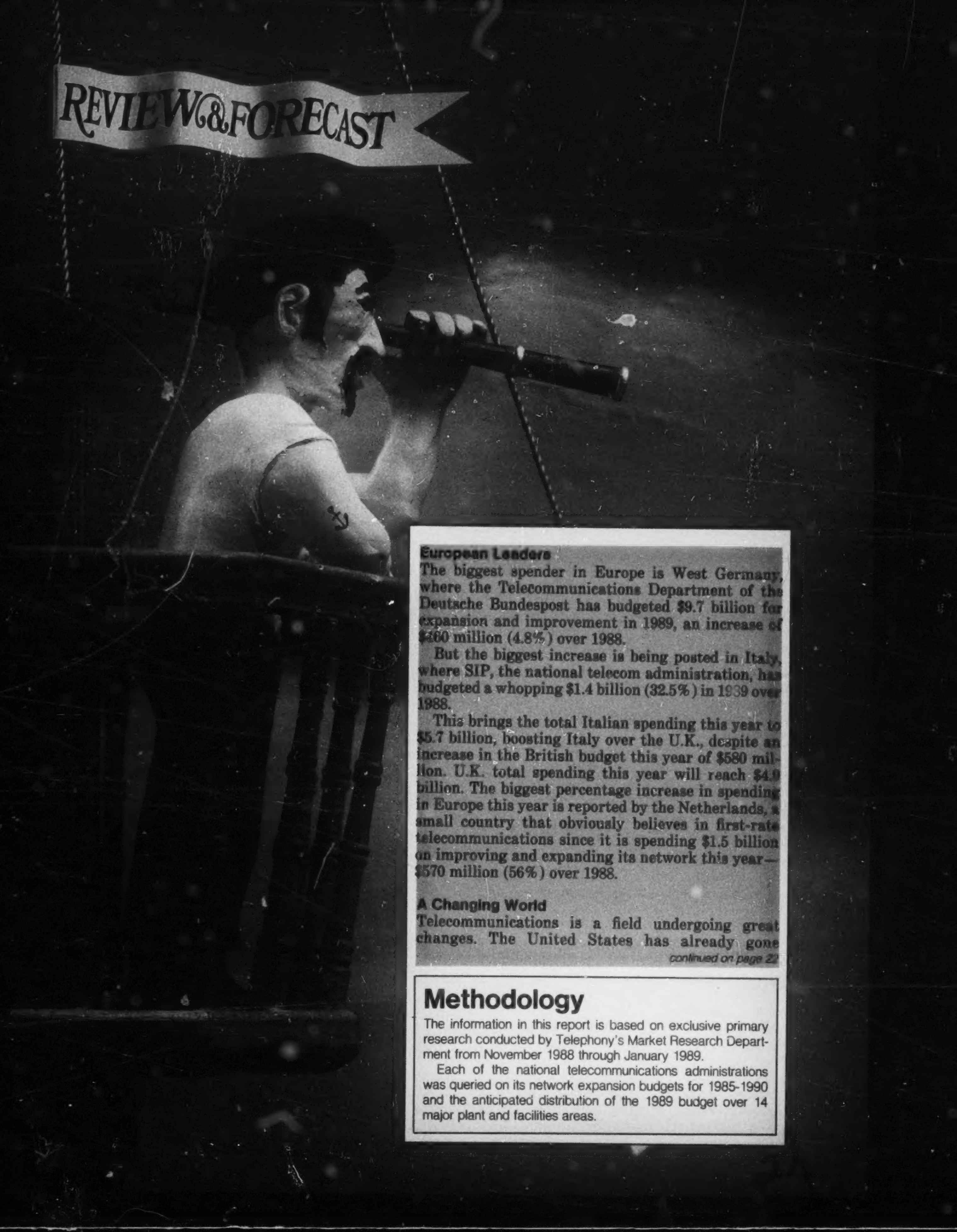
LEO ANDERSON, Publishing Consultant
CZATDANA INAN, Director of Marketing

Europe will be the powerhouse in this year's telecommunications expansion.

While the rest of the world is marking time, or even dropping back in terms of expenditures for telecom improvement and growth, the countries of Western Europe are increasing spending $3.2 billion in 1989, that is, from $40.7 billion in 1988 to $43.9 billion this year, a 7.8% rise (see table on page 25). North American spending remains virtually level—$29.1 billion this year, as compared to $29.0 billion in 1988. Three of the major segments of North American telecommunications—the U.S. Independent telephone companies, U.S. long-distance carriers and Bell Canada—show declines in spending for 1989. Only higher budgets by the biggest segment of them all—the U.S. Bell regional holding companies—put North American telecom expansion on the positive side compared to last year. (Details of U.S. budgets and planning can be found in the Jan. 9 issue, page 22.)



European Leaders

The biggest spender in Europe is West Germany, where the Telecommunications Department of the Deutsche Bundespost has budgeted $9.7 billion for expansion and improvement in 1989, an increase of $460 million (4.8%) over 1988.

But the biggest increase is being posted in Italy, where SIP, the national telecom administration, has budgeted a whopping $1.4 billion (32.5%) in 1989 over 1988.

This brings the total Italian spending this year to $5.7 billion, boosting Italy over the U.K., despite an increase in the British budget this year of $580 million. U.K. total spending this year will reach $4.9 billion. The biggest percentage increase in spending in Europe this year is reported by the Netherlands, a small country that obviously believes in first-rate telecommunications since it is spending $1.5 billion on improving and expanding its network this year—$570 million (56%) over 1988.

A Changing World

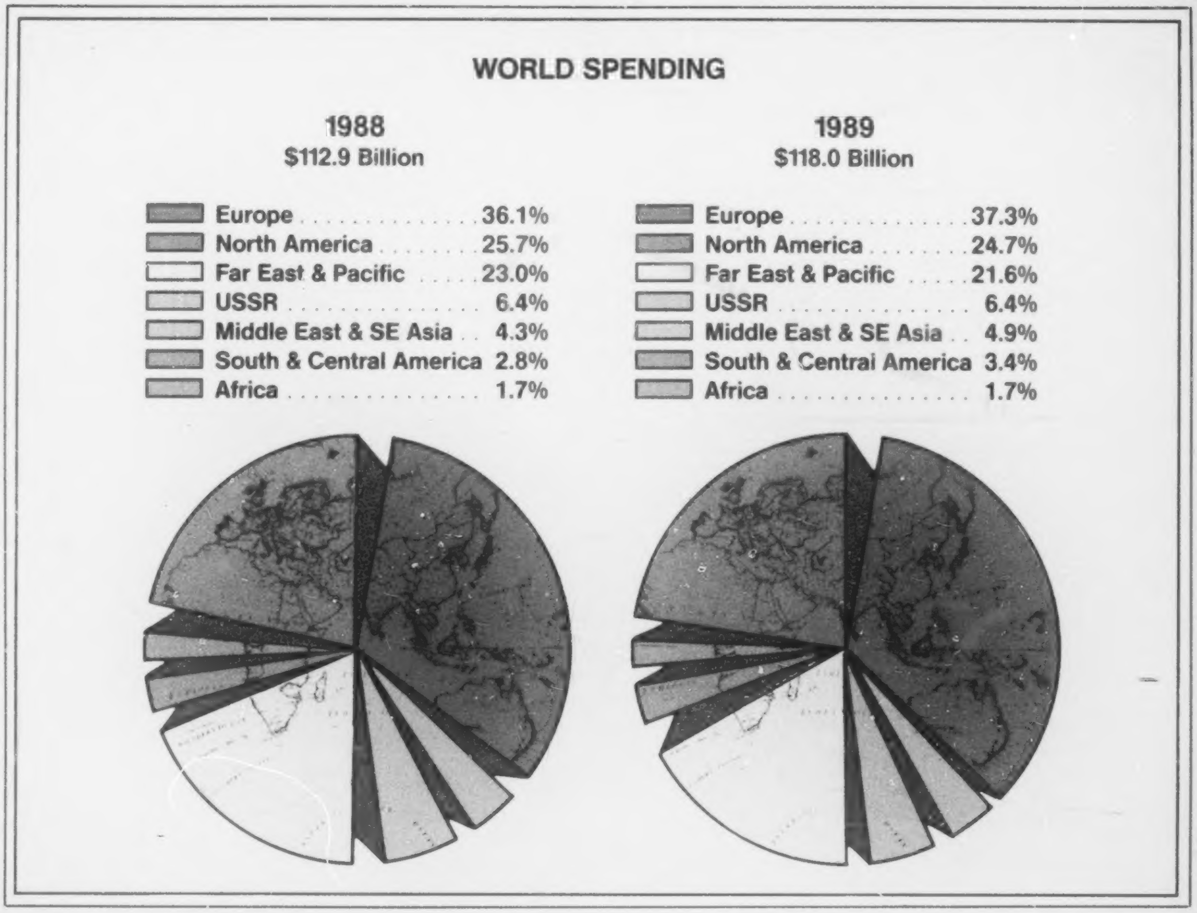
Telecommunications is a field undergoing great changes. The United States has already gone

continued on page 22

Methodology

The information in this report is based on exclusive primary research conducted by Telephony's Market Research Department from November 1988 through January 1989.

Each of the national telecommunications administrations was queried on its network expansion budgets for 1985-1990 and the anticipated distribution of the 1989 budget over 14 major plant and facilities areas.



WORLD SPENDING

REVIEW & FORECAST

continued

through most of the change and is settling down.

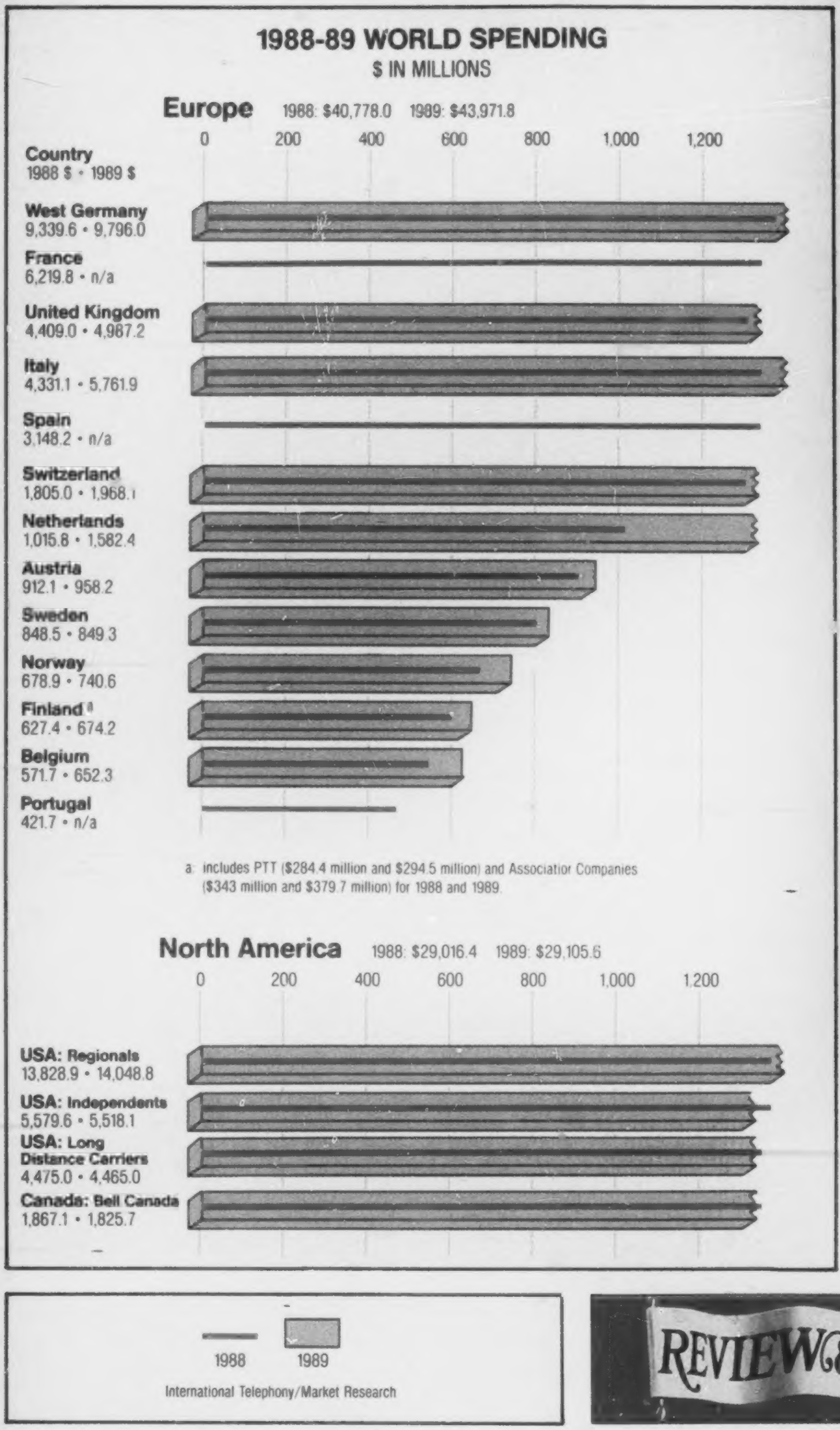
Europe, on the other hand, is heating up and approaching the boiling point. Since change costs money—lots of money—that likely accounts for the increased spending in Europe this year. Three forces are driving the change in Europe. The first is made up of one cause and two effects. The cause: Liberalization, the removal, to a large degree, of telecommunications from strict government regulation and control. The effects: New competition to the old-line service providers and reorganization of those administrations to meet the competitive challenge. Comments from telecom administrators participating in this survey report indicate what is happening (beginning on page 28).

In West Germany it is predicted that a government-mandated "restructuring" will take place in 1989 so that from mid-year onward "competition is to be the rule and monopoly the exception." In Great Britain, site of the first extensive liberalization in Europe, British Telecom says, "We pay particular attention to developments in regulatory and competitive policies." In Belgium it is expected that the first steps will be taken this year in a "reform" that will "restrict monopoly to the infrastructure and a limited number of basic services," and that also "will adapt the present PTT to its new competitive environment." The Swiss PTT says all of Europe, including Switzerland, is "heading toward a fully competitive telecom market," and the PTT aims to so satisfy the needs of customers that it will "remain the leading service provider and supplier of telecom equipment."

As 1989 dawned, the Netherlands PTT was reorganized into a central holding company and several separate companies. One was the PTT telecom company, which, says its president, has undergone "an internal restructuring, enabling us to address the market with increased efficiency and flexibility." Finland, which has 58 local telephone companies in addition to the government telecom administration, has granted competitive concessions to the local companies and is further encouraging competition by permitting a data transmission company owned by the local telcos to compete with the Finnish PTT's data transmission service. At the same time, a PTT-owned company is competing in local telecommunications.

Digitalization and ISDN

The other two driving forces powering European telecom expansion are digitalization of the network and ISDN. All European telecom administrations



a: includes PTT ($284.4 million and $294.5 million) and Association Companies ($343 million and $379.7 million) for 1988 and 1989.

International Telephony/Market Research

REVIEW & FORECAST

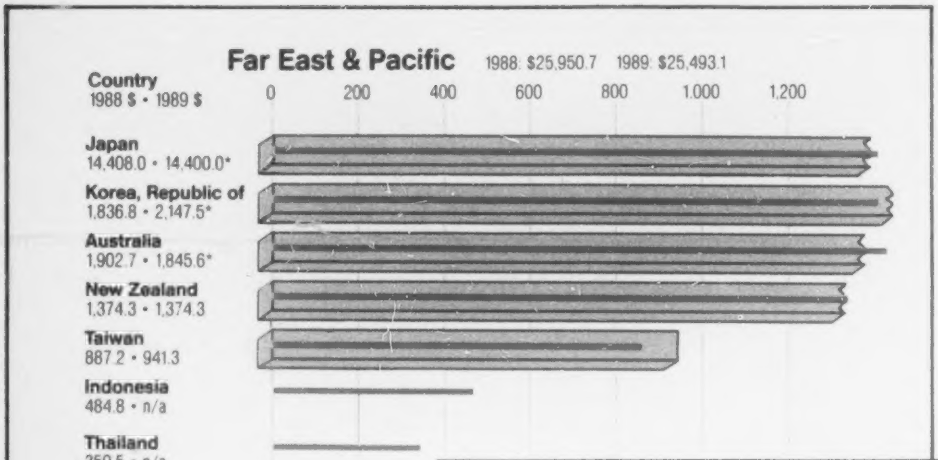
are moving forward on digitalization, each at its own pace, and most have begun experimental ISDN offerings or announced plans to do so. Sweden has been committed to digitalization since the beginning of the 1980s, says the Swedish Telecommunications Administration, and "the time has now come to take full advantage of the digital network . . . to facilitate the introduction of ISDN at low cost." Jutland Telephone, one of four companies that serves Denmark, will begin an ISDN test this year, which will involve three of its exchanges, as well as exchanges of the other Danish telcos and connections with Sweden.

The Norwegian Telecommunications Administration expects to have 32% of its subscribers connected to digital exchanges by the end of this year; 50% by 1993. Pilot ISDN projects at NTA are expected to turn into regular service beginning in 1992. In Fin-

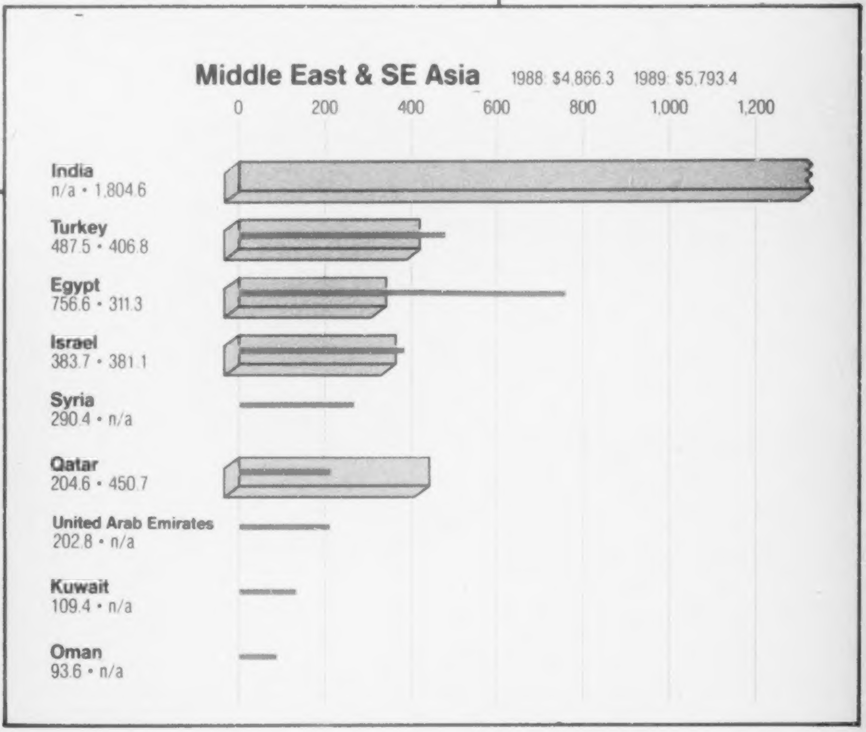
continued on page 25

1988-89 WORLD SPENDING

$ IN MILLIONS



* estimated by International Telephony/Market Research



REVIEW&FORECAST

continued

land, also, an ISDN trial was launched in 1988. So far as digitalization goes, it is expected that nearly 100% of the trunk network will be digitalized by 1995.

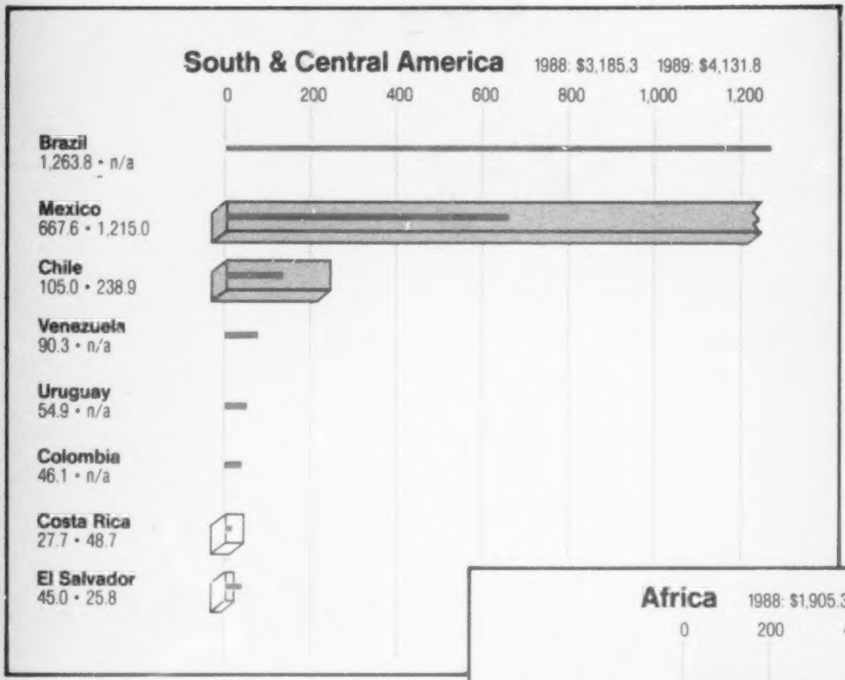
In France, the network is already more than 65% digital, and ISDN has been in commercial operation more than a year, reports France Telecom. It now has 600 paying ISDN customers in Paris and its suburbs, and it expects to have nationwide deployment by 1990, FT says. In Italy, SIP, the telecom administrative body, says digitalization is a primary objective for the network. SIP adds, "Digital switches will replace electromechanical switches in 45% of the central offices by 1992 and the rest by the year 2000."

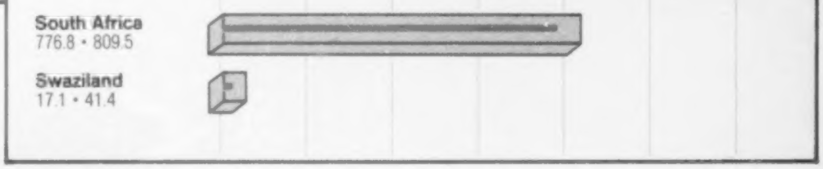
In addition to spending a lot of money on new technology, SIP is paying a lot of attention to POTS in its goals, including increasing the number of subscribers to 42 per 100 population, eliminating held orders so as to arrive at a point where service orders are cleared in two weeks, and completing 95% of repairs within a day of trouble reports. These goals are to be achieved by 1992 under the SIP four-year plan. The termination of that plan, of course, coincides with the date on which all trade barriers within

continued on page 26

1988-89 WORLD SPENDING

$ IN MILLIONS





REVIEW & FORECAST

continued

the European Economic Community are to be eliminated.

Several other European PTTs also plan to have their systems in tip-top shape by that date, apparently feeling that a region without trade barriers should be without communications barriers as well.

Asian Hot Spots

Nippon Telegraph & Telephone of Japan towers above other Asian telecom administrations with its $14.4 billion network expansion and improvement budget for 1989, which is virtually the same as last year's. NTT has had an ISDN test running since last spring, providing 64 kb/s service, and it plans 1.5 Mb/s service to 28 metropolitan areas this spring. NTT, formerly a government-owned entity, has now been a private company for five years. In that time it has become one of the most advanced telecom systems in the world.

Cause and effect? Who knows?

An up-and-coming telecom leader in Asia is the Republic of Korea, whose $2.1 billion 1989 telecom budget represents a 16% increase over 1988. The Korean Telecommunication Authority is wholly owned by the government but will begin to go public this year through sale of 20% of its stock. It is expected that eventually KTA will be 50% publicly held. A technical highlight for the company this year will be the scheduled completion of the first trans-Pacific FO cable system, a project in which KTA has been participating, along with the telecom authorities of Japan, Hong Kong and the People's Republic of China, as well as AT&T. The Republic of Korea is one telecommunications success story, thanks to a booming economy, in what is probably still considered a "developing country."

There are other successes in that category. Turkey is one. Here's a country where telephone density five years ago was 3.5 per 100 people, telex exchange lines numbered 8220 and more than 70% of all villages were without phones. By 1988 telephone density and telex lines had nearly trebled, and all the villages had telephone links. The aim is to have 25 lines per 100 population by 1992, and the Turkish PTT is budgeting to do it.

For 1989, much of the international telecommunications spotlight will remain focused on Europe, where the 1992 single-market deadline looms large. Our research indicates, however, that there are many other smaller telecom stories unfolding that may be on center stage in a year's time. ■

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Telephony

AN INTERTEC PUBLICATION APRIL 3, 1989 INTEGRATING VOICE & DATA COMMUNICATIONS $3

THE PUBLIC NETWORK GOES ON-LINE

The first BOC videotex gateways are open for business in Atlanta and Vermont

GTE CAUGHT IN TEXAS RATE CASE CONTROVERSY

1100 jobs are cut and more are in jeopardy

MCI PROTESTS EXPANSION OF FTS 2000

It claims GSA is unfairly foisting network on agencies

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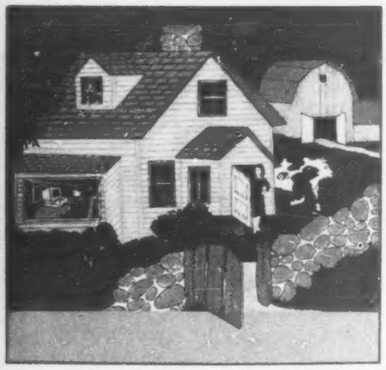
Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



Will Nynex's new videotex gateway have appeal across the Vermont countryside? Other RHCs and industry skeptics are closely eyeing the Vermont landscape, as well as Atlanta's new BellSouth gateway, to see if the services will fly. Cover art by Laura M. Doyle

NEWS OF THE WEEK

8 **GTE CAUGHT IN TEXAS RATE CASE CONTROVERSY**
In the wake of a $197 million rate cut, GTE Southwest cuts 1100 jobs while its corporate parent reconsiders plans to base its national telephone operations in Texas

9 **MCI PROTESTS EXPANSION OF FTS 2000**
Fearing the loss of more government business, MCI claims the General Services Administration is foisting the FTS 2000 network on agencies unfairly

9 **BELLCORE TRIF TACKLES ISDN OPERATIONS**
The research consortium introduces its first three technical advisories on ISDN basic rate operations interfaces

12 **TIA TAKES ON RHCs IN MFJ BATTLE**
The manufacturing association is gearing up to convince Congress that safeguards aren't enough to protect against monopolistic action by the Bell regional holding companies

FEATURES

24 **SYSTEMS TESTING—A TOWER OF BABEL?**
By Michael Warr. Numerous proprietary interfaces, instead of language barriers, are holding up the trend toward integrating test systems. As a result, standardizing the industry through a common language protocol may be easier said than done

26 **THE PUBLIC NETWORK GOES ON-LINE**
By Fredric Saunier. Skeptics question whether videotex will appeal to the masses, as the first Bell operating companies start up their videotex gateways

38 **WHY TRAVEL WHEN YOU CAN CALL?**
By Scott Douglas. The seedling videoconferencing industry seems ready to bloom with the onset of dropping costs and increasing performance and ability. Bursts of profits and growth can't be far behind

DEPARTMENTS

62 ADVERTISERS' INDEX
6 IN MY OPINION
18 LETTERS
22 MEETINGS
64 MOVING AROUND INDUSTRY
47 NEW PRODUCTS AND SERVICES
43 THE WAY WE WERE

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Why travel when you can call?

Although the videoconferencing industry is still in its infancy, it is a market ready to bloom. Costs are going down and performance and availability are going up. Can profits and exploding growth be far behind?

SCOTT DOUGLAS

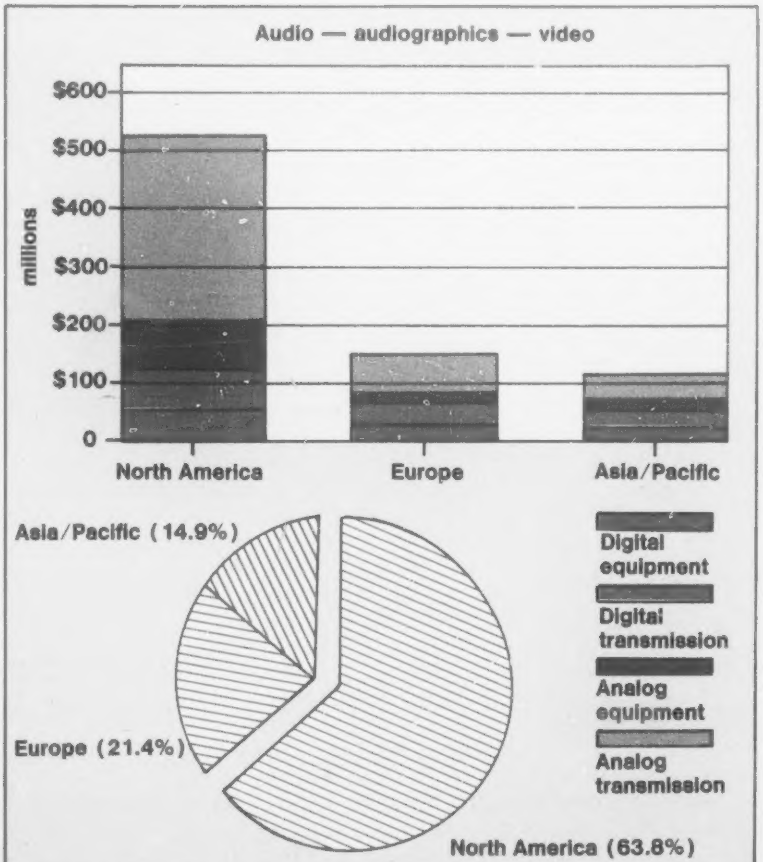
As always—at least in the days of the old Bell System—AT&T was there first.

In 1982 it launched its Picturephone Meeting Service, the earliest public videoconferencing rooms available. Three years later, it shut them all down, saying that the service never really lived up to early expectations.

But AT&T didn't abandon public videoconferencing in 1985; it just shifted direction. Instead of operating its own rooms, it announced in August 1985 that it was entering a joint venture with Hilton Hotels to operate a videoconferencing service in hotel meeting rooms so that participants had access to basic amenities such as meal service, parking, 24-hour availability and lodging.

The marketing agreement between AT&T and Hilton has ended, although approximately 12 Hilton hotels still offer videoconferencing service.

FIGURE 1 WORLDWIDE '88 TELECONFERENCING REVENUES



Since AT&T took the first swing in the videoconferencing ballgame, the market has changed dramatically. Digital videoconferencing currently represents $230 million, or about 29%, of the total global market for teleconferencing (Figure 1), which was approximately $800 million at the end of 1988 (Figure 2). About half of the world's videoconferencing takes place in the United States. European countries represent 30% of the world market for interactive videoconferencing. And Japan leads the Far East in using the equipment, developing the technology and investing in U.S. firms that already have developed image communications technology.

Within the U.S., the annual growth rate of videoconferencing has been—and is expected to remain—in the 25% to 30% range. Outside the U.S., the growth rate is even greater.

Even in the U.S., though, the digital video systems market is still in its infancy—with only 1000 systems installed at the end of last year. Using digital videoconferencing a group of individuals can conduct a face-to-face meeting without traveling. Facial expressions and voice inflections, as well as graphics, computer-generated data and images of objects, can be easily shared using cameras, television monitors, an audio system, a video codec and a digital telecommunications line.

Industry Trends

There are a number of key trends in the technology as well as the market for image communications. Hardware costs are decreasing. The importance of software-based products is increasing. And

continued on page 40

Why Travel *continued*

most North American, Japanese and Northern European telecommunications managers will have the integrated services digital network by the early 1990s, opening the market for a new generation of videoconferencing products.

Within the next five years many new uses will surface for these technologies. Desk-to-desk teleconferencing may spur the growth of videoconferencing, with the camera and the codec being two of the options available to the office workstation.

The use of videoconferencing codecs for trans-Atlantic communications, however, will remain expensive until trans-Atlantic ISDN becomes readily available and users embrace the technology as a viable alternative to business travel.

Get Moving

There have been a number of breakthroughs in digital motion videoconferencing. In addition to ISDN, these developments include the introduction of a codec on a personal computer board and the debut of integrated videotelephones. And, the CCITT will recommend in July 1990 an intermediate international standard for videoconferencing at multiples of 64 kb/s that will be finalized by 1992.

ISDN will reduce prices for equipment and network usage for dial-up teleconferences. Users will be able to select equipment from different manufacturers based upon factors such as local support, price and performance. Within the U.S., all Bell regional holding companies and the majority of the Independent telephone companies have ISDN trials in progress. More than half of the RHCs have some form of commercial ISDN service available. And worldwide there are at least 12 countries that currently offer ISDN service or plan to by the early 1990s.

Although a half dozen manufacturers offer codecs that operate at the basic ISDN rate of 128 kb/s, and all codec manufacturers plan to interface with ISDN, the standard that will allow interoperability at data rates from 64 kb/s through 2.048 Mb/s is not expected to be in place until next year.

The original codec produced in the late 1970s was as large as a rack of equipment 8 ft. high. In the last two years, it has shrunk to the size of a single board within a personal computer. As a result, power and heat displacement requirements also are being reduced. In the next decade, it is likely that research and development efforts will lead to a codec on a chip.

It's a Small, Small World

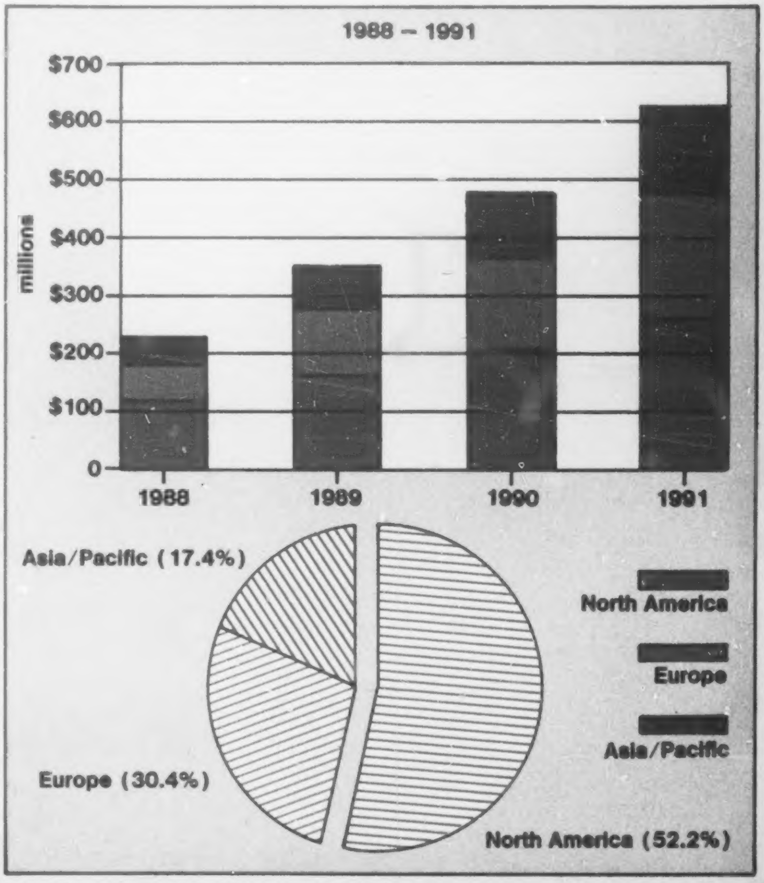
In the early days of videoconferencing, users could only use the technology in a custom-built videoconferencing room. Now users have the option of using modular units, small roll-about units, PC-based units and videotelephones. As options have increased for users, the price tag for using videoconferencing technology has decreased from $250,000 to $500,000 for a custom videoconferencing

continued on page 42

Videoconferencing codec suppliers

CIT-Alcatel
Compression Labs
Concept Communications
EyeTel Communications
GPT Video Systems
Mitsubishi Electronics
NEC America
OKI America
Philips Kommunikations Industries
PictureTel
Tandberg Telecom
Videocom International
VideoTelecom
Vistacom Industries

FIGURE 2 WORLDWIDE DIGITAL VIDEOCONFERENCING



Why Travel *continued*

room to as little as $12,000 for a codec on a PC board. Within three years the price could easily drop to $2000 for a PC board codec.

At the Telecon VIII conference in Anaheim, Calif., last fall, Oki, NEC and Mitsubishi all displayed videotelephones as small as executive desk telephones that were based on Kokusai Denshin Denwa's Invite 64 videotelephone. Vistacom, a European manufacturer, showed an integrated videotelephone that had a codec the size of a PC.

And Datapoint, a U.S. vendor, showed a PC-based system that communicates on a local area network and uses a codec for long-distance videoconferencing.

In addition to these suppliers, there are several Japanese firms—Sony, Fujitsu, Matsushita and Sanyo—that plan to offer videoconferencing in the U.S. in the near future.

There currently are many obstacles to videoconferencing market growth. The lack of industry standards for lower rate—384-kb/s down to 56-kb/s—video systems is just one of many roadblocks that restrain growth by limiting user choices.

Lack of connectivity to switched, digital networks in multiples of 56 kb/s and 64 kb/s is another hurdle because the available limited motion video codec technology is most effective at those rates. As the technology advances, the image quality is expected to improve enough so that these basic rates would be acceptable to the market. And as ISDN becomes more readily available, higher transmission rates will be more accessible.

Lack of international digital connectivity is being overcome through the efforts to implement the trans-Atlantic and Pan-Pacific fiber optic cable networks. Although satellites provide digital connectivity, there is not much room left for digital growth on the existing transoceanic satellites.

The growth of the videoconferencing industry depends on a number of trends and developments: the arrival in Europe and North America of narrowband ISDN services; the development of algorithms that provide compression of full-motion color images to 56 kb/s and 64 kb/s; the increasing provision of a greater range of communications functions for PCs; and the development of the intermediate international CCITT standard for 64 kb/s to 2.048 Mb/s in July 1990.

The future for image communications looks bright. Both the videoconferencing products and the networks they rely on are increasing in performance and availability and decreasing in cost. What more could a blossoming industry want? ■

Scott M. Douglas is the Managing Partner at Telemanagement Resources International Inc., Lake Wylie, S.C.

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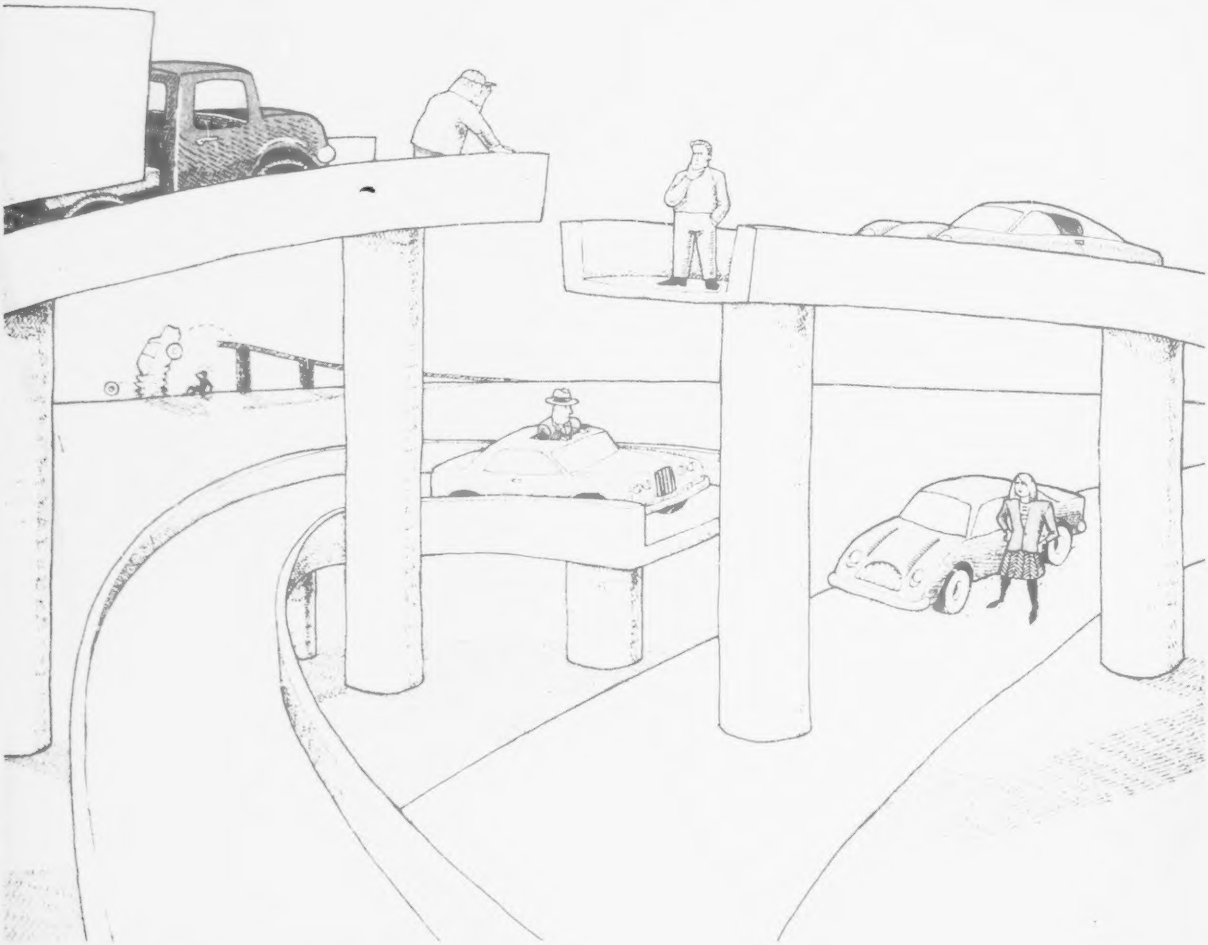


HOW DO YOU MANAGE THE MULTILEVEL NETWORK?

That is the latest dilemma facing both users and equipment vendors

PUBLISHERS PLAN TO FIGHT MFJ BILL

ANPA wants to kill legislation that would allow RHCs into info services

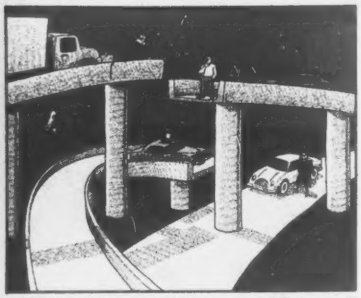
BELL REFUND ORDER LEFT STANDING

The Supreme Court refuses to hear a 1978 case involving $101 million

MONDAY, MAY 1, 1989 Volume 216, No. 18

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



What good is a spanking new, red Corvette if the local highway system is so unplanned that you can't get where you want to go? Users and vendors aren't dazzled so much by technology anymore: They need network management for their operations systems.
Cover art by Jim Colao

NEWS OF THE WEEK

10 **ANPA VOWS TO OPPOSE MFJ LEGISLATION**
Publishers plan to launch a major lobbying effort to kill legislation that would allow the Bell regional holding companies into information services

10 **BELL SYSTEM REFUND ORDER LEFT STANDING**
The Supreme Court refuses to hear a 1978 case involving a $101 million refund the FCC ordered the Bell System to make

11 **LACK OF TRUST HURTS ONA PROGRESS**
A new report says the lack of cooperation among competing interests may prevent Open Network Architecture from producing significant gains for anyone

20 **ISDN EQUIPMENT ENTERS SECOND GENERATION**
Vendors unveil second-generation desktop products that make use of ISDN basic rate interface capabilities

FEATURES

26 **INCENTIVE REGULATION: HIGH PRIORITY FOR LECs**
By David L. Wenner. British Telecom has bathed itself in incentive regulation waters. Will its experience help keep U.S. local exchange carriers afloat in the turbulent sea of price caps?

34 **MANAGING THE MULTILEVEL NETWORK**
By Stephen Fleming and Joel E. Jakubson. The sparkle has gone out of new technology for many users and vendors. Their more immediate concern is managing that technology with existing and future operations systems

DEPARTMENTS

62 ADVERTISER'S INDEX
6 IN MY OPINION
24 MEETINGS
64 MOVING AROUND INDUSTRY
44 NEW PRODUCTS AND SERVICES
42 THE WAY WE WERE

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On Jan. 22, 1988, the U.S. Court of Appeals in Washington threw out the FCC's authority to order carriers to make refunds when they earn more than their FCC-prescribed rates of return (*Telephony, Jan. 25, page 3*). In that order, the appeals court said that, while the FCC had the authority to order refunds, it found fault with the way the refund rules were structured. It said that the current refund rules—adopted in 1985—are inconsistent with stated commission goals and that the rules seem "to guarantee the regulated company an economic loss."

Now that the Supreme Court has left the FCC's basic refund authority intact, the agency is expected to work on its refund rules to bring them into line with the appeals court ruling. It is also a safe bet that those refund rules will face challenges.

OVERALL ENHANCED DATA SERVICE MARKET

Market segment	1988 Sales ($ million)	1988 Market share
Vertical and processing	**4800**	**44.0%**
Credit	1600	14.6%
Financial	**1400**	**12.7%**
VAN services	800	7.9%
Academic/scientific	**450**	**4.1%**
Government	350	3.1%
News	**350**	**3.1%**
Transactional	200	1.7%
Consumer videotex	**150**	**1.4%**
Other	800	7.4%
Total	**10,900**	**100.0%**

Source: the Yankee Group

Cooperation needed for ONA progress

Paul Travis, Executive News Editor

The lack of trust and cooperation among competing interests—Bell regional holding companies, enhanced service providers and end users—may prevent Open Network Architecture from producing significant short-term gains for any of the market participants.

ONA "is unlikely to prove broadly successful until advanced services become the staple product—and that will not occur until nearly 1995," according to a new report called "Leveraging ONA" from Yankee Group, a Boston consulting firm.

ESPs "remain fearful—to the point of phobia—of RHC ONA intentions," the report said. Users see "brave new market opportunities," but are worried about RHC entry into some of their traditional markets via enhanced services. And most RHCs "resist ESP and end-user requests rather than trying to find common ground on which to build a successful ONA foundation."

ONA is a plan by the Federal Communications Commission to open up local networks and to provide equal access to all parties to unbundled local network service elements. It is designed to allow the RHCs to enter the enhanced services market, while providing safeguards for competing ESPs.

The FCC gave partial approval to the first ONA filings by the RHCs, but asked for some revisions. The new ONA filings are scheduled for this month.

The ONA that emerges later this year "will not mandate any further unbundling, will not be open per se, and will not be structured around any formal architecture. Moreover, the individual ONA services most in demand are likely to be the last and least implemented," the report predicted.

While criticizing much of the RHCs' ONA effort, the report singled out Nynex and Ameritech for leading the way "in providing far-reaching ONA compliance. While Nynex offered a large basic service element menu, Ameritech proposed cost-based pricing, extensive federal and state tariffing. Ameritech also allowed ESPs to maintain existing services and to use BSEs with those services.

Based on research and interviews with the RHCs, ESPs, users and regulators, the report said most of the major participants "are taking antagonistic or apathetic stances" and said "this standoffish behavior increasingly will be self-defeating. ONA begs for participants who cooperate in the belief that, in the end, they will be better off with smaller pieces of a dynamically expanding pie than in larger pieces of an underdeveloped pie."

Yankee Group said the overall enhanced data services market hit $10.9 billion in 1988, with less than 1% coming from the consumer market (see chart above).

The report estimated the business information services market could grow to $26.8 billion by 1993.

However, the RHCs will be unable to grab a significant piece of these existing markets through ONA unless they provide key services demanded by ESPs, such as collocation, more unbundled network elements and the addition of integrated services digital network-like basic service elements to the ONA menu, the report predicted.

In addition, the report said the RHCs are missing an opportunity to boost their core business—local network traffic—in their eagerness to get into the high-profit, enhanced services market.

"Most RHCs do not talk much about ONA increasing local traffic via demand for third-party ESP services; about keeping end-user traffic on the local public network through element unbundling and collocation; or about making easy money by acting, through collocation, as network landlord to a thriving third-party information content business (and to network 'tenant' bypassers).

"Curiously, however, these are ways the RHCs could leverage ONA immediately and substantially, rather than leav-

continued on page 12

ing a less robust ONA to leverage ultimate benefits only in the future through the lifting of regulatory restraints," the report said.

Noting that the "ultimate promise of ONA lies in the potential for deregulation," the report said the RHCs could hurt their chances for elimination of Modified Final Judgment restrictions if U.S. District Judge Harold Greene is not convinced the RHCs have opened their networks and ONA is working in the market place.

"By complying minimally in reaction to what they consider unfair regulatory treatment, RHCs may postpone regulatory relief instead of speeding it," the report said.

The RHCs face two options, the Yankee Group report said. One option for the RHCs is to develop gateways, mine third-party ESPs to stimulate market demand, and reap a 15% to 35% share of information dollars.

The other option is for the RHCs to win regulatory freedom and individually develop mammoth information processing infrastructures to sell transport, timesharing, information databases and other services. "But the RHCs risk creating massive infrastructures without any ready customer base."

In the long run, the report said there will be broad availability of ISDN-like BSEs by 1995 "and it may become crucial to RHCs that ONA service menus are broadened quickly. Potentially, for example, interexchange carrier control of the enhanced data services market could become so entrenched by 1995 that subsequent significant RHC participation will be all but precluded."

The report concluded that the "success of ONA ultimately will hinge upon all market participants finding common ground. . . . There will be no winners unless suppliers work together to provide a universal community of services." ■

AT&T wants into electronic publishing market

Charles Mason
Washington Editor

Since the divestiture agreement in 1982, AT&T has been prohibited from engaging in electronic publishing. Under the terms of divestiture, however, that prohibition is scheduled to expire in August, and AT&T says it wants to make sure that happens.

The company has gone to U.S. District Judge Harold Greene, asking that he allow the prohibition to die on schedule. Greene could continue the ban if he feels entry by AT&T would endanger competition. Based on his previous statements, however, it is believed Greene will not extend the ban.

AT&T has not disclosed what it might do if the ban is lifted. But AT&T has told Greene that competition has intensified and it should be allowed to participate in the industry.

In its April 21 filing with the judge, AT&T said that the electronic publishing business is now heavily populated with

continued on page 14

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Incentive regulation should be a high priority for LECs

British Telecom has bathed itself in incentive regulation waters. Will its experience help keep U.S. local exchange carriers afloat in the turbulent sea of price caps?

DAVID L. WENNER

More than four years ago the U.K. launched the world's first large-scale experiment in incentive regulation: The government gave British Telecom the opportunity to price flexibly and earn more than its cost of capital—if it could do so while reducing real prices.

Although the results have been mixed, in the past six months the experiment has begun to look successful.

Profits have increased every year and stock performance has recently outpaced the market. At the same time, real prices have declined 12% overall and service quality has now improved over historical levels.

With experiments now under way in at least 15 states, lessons learned in the U.K. may help U.S. local exchange carriers face the challenge of creating value for customers and shareholders under incentive regulation (Table 1).

The Birth of BT

In the years before incentive regulation, BT was a sleepy agency under the U.K.'s Department of Treasury. Service was poor and the network antiquated. Government policies forced BT to generate cash to support other public programs, leaving the agency with a network consisting largely of Strowger step-by-step equipment. In fact, some of its central offices were 50 years old.

As a result, BT failed to realize the improved capabilities and dramatically lower costs U.S. LECs were beginning to enjoy. LECs in the U.S. moved to analog exchanges in the 1960s and 1970s and now were rapidly converting to digital exchanges. While BT's access lines per employee stood at 94 in 1984, the figure for the average Bell regional holding company was 150—and climbing.

BT's behavior began to change markedly in the early 1980s. The government—under Prime Minister Margaret Thatcher—announced its intention to convert BT, a bureaucracy of some 240,000 people, into a privatized organization, competitively viable in the U.K. and world markets. BT then launched an ambitious modernization and cost-reduction program.

In late 1984 BT was privatized and regulated, under a price-cap plan, by the U.K.'s Office of Telecommunications. The cap for a "basket" of services (line rentals and local and long-distance call-

continued on page 28

TABLE 1 MAJOR LEC INCENTIVE REGULATION PROGRAMS*

State	Company	Services covered	Duration of program (years)	LEC concessions (millions)	Price promise	Profitability limits	Profit sharing
Alabama	South Central Bell	All	5	$64.1	Freeze	No	No
Arkansas	Southwestern Bell Telephone Co.	Basic	2	16.3	Freeze	No	No
Connecticut	Southern New England Telephone Co.	Basic	Indefinite	31.5	Freeze	Yes	Yes
Delaware	Bell of Pennsylvania/ Diamond State Telephone	All	2	12	Freeze	Yes	No
Florida	Southern Bell	Basic	3	67.5**	Freeze	Yes	Yes
Kentucky	South Central Bell	Basic	1	5.5	Freeze	No	Yes
Maryland	C&P Telephone of Maryland	Basic	4	0	Freeze	No	No
Nebraska	U S West Communications	All	Indefinite	0	Formula	No	No
Nevada	Centel Corp.	All	2	7.5	Freeze	No	No
New Jersey	New Jersey Bell	All	3	4	Freeze	No	No
New York	New York Telephone	All***	3	100	Freeze	No	Yes
	Rochester Telephone Corp.	All***	3	6.7	Freeze	No	Yes
Vermont	New England Telephone	All	3	0	Freeze	No	No
Virginia	C&P Telephone of Virginia	Various	Indefinite	37.5	Freeze	No	No
West Virginia	C&P Telephone of West Virginia	Basic	2	6.7	Freeze	No	Yes
Wisconsin	Wisconsin Bell	All	2	32	Freeze	Yes	Yes

*In addition to the approved programs listed above, more than 20 other states were reviewing some degree of incentive regulation as of March 1.

**First year of plan

***Except competitive services

Source: PSC interviews; McKinsey analysis; Regulatory Research Associates Inc.

ing) was set at a retail price index of −3%. In other words, U.K. telephone customers were guaranteed a declining real price of services. BT's profitability depended on its ability to generate new revenues and reduce costs.

In 1987 BT ran into severe service problems. A wage strike by 110,000 service technicians created an extended backlog, slowing response time. According to an Oftel report, BT's performance of fault clearance within two days slipped from a level of 80% in 1981-1982 down to 52% in 1986 and to 38% in 1987. By that time almost 25% of all U.K. pay phones also were out of order. Consumer organizations went on the attack. According to the *Financial Times*, BT became the most "loathed" organization in the U.K.

Since then, however, BT has shown marked improvement. In 1988 it reported that more than 92% of pay phones were operating and that the rate of faults cleared within two working days had risen to more than 90%. Complaints by consumers dropped by almost half in 1988, according to the Telecom Users Association.

Efforts to generate new revenue and reduce costs paid off, allowing BT to invest £2 billion ($3.38 billion) a year in digital switches and fiber optics.

BT experienced a net income gain of 44% between 1984 and 1988, compared to a 30% gain experienced by the RHCs during the same period. BT's return on equity now stands at about 18%, higher than any RHC's.

With this level of return, Oftel recently tightened the price cap a notch. When the current agreement expires in August, BT's price path will be limited to RPI −4.5%.

Oftel's agreement to a new price-cap contract clearly indicates that the agency still favors incentive regulation. And so does BT management.

"There appears to be agreement about the advantages of a price-control scheme compared with other forms of regulation," says the company's 1988 annual report. "In particular, a price-control scheme is effective in delivering real price reductions overall to customers, encourages company efficiency and is simple to administer." The BT experience seems to have turned into a win-win story.

What's in it for us?

Before an LEC can decide how aggressively to pursue incentive regulation is the approach to take, it must answer these questions:

- *What are our opportunities for creating value?*

No LEC management team yet has a completely developed vision of how it will operate differently under incentive regulation. The company needs to at least scope out improvement opportunities to get a good idea of which initial changes to pursue. It is not enough to calculate under current revenue and cost plans how well the company will operate using various incentive regulation programs. Management also should begin to formulate new objectives and plans that will get the company to the next performance level. Once options to reduce costs or increase revenues are identified, management should evaluate them as alternative strategies spanning a range of investment and risk. This evaluation should include estimates of cash flow and net present value, so that both the potential and risk to shareholders can be understood.

- *Have we thought enough about the design of the program?*

Is the incentive large enough to encourage change? Does it motivate new investment as well as cost reduction? Does the formula limit risk to acceptable levels, even under high inflation rates and recession? Finally, does the program distribute value appropriately between shareholders and customers?

- *Are we organized to track and communicate our performance?*

Is someone tracking all key costs, service and innovation parameters? Can we tell how performance relates to each customer class? As BT learned, it is essential that incentive regulation benefits all customers and that customers know it.

The U.S. Challenge

With more advanced technology in place, U.S. LECs are approaching incentive regulation with greater capabilities, higher service levels and lower costs than their British counterpart. The changes accompanying incentive regulation are likely to be less revolutionary and disruptive to both LECs and their customers. So what can LECs on the other side of the Atlantic learn from this experience?

Although they cannot draw direct parallels from BT's experience, LECs can learn about the likely direction of this change. Carriers face two similar challenges in implementing incentive regulation.

First, LECs must ensure that incentive regulation creates more value than rate-of-return regulation. Second, they must ensure that both customers and shareholders receive a fair share of that value (see related story, page 30). These are practical necessities if LECs want to end up with a long-term regulatory program that maximizes shareholders' benefits and holds the cost and invasiveness of regulation to a minimum.

To create more value, LECs must lower costs and innovate faster than they would have under rate-of-return regulation, while providing good service.

With advances in technology, LECs can introduce many new services more quickly during the next few decades. The possibilities range from the simple but highly marketable caller identification feature now available to the more glamorous feature of selecting and viewing videos at will. Technology already in place—combined with the network capabilities of signaling system 7, two-wire ISDN and, eventually, broadband—makes such services possible.

Network modernization will continue to generate cost savings. Organizations also can reduce costs by further streamlining operations. For example, reducing overhead costs by 20% and main-

continued on page 30

taining these costs 20% below where they might have been would create about $1.7 billion in net present value at an average RHC.

Quality of service is already high in the U.S. Given an incentive, LECs might find it feasible to offer even higher levels of service, such as customized service levels for individual customer segments or better coordination with other suppliers to approximate the one-stop shopping of pre-divestiture days.

The LECs have already implemented many of these changes under rate-of-return regulation. In terms of productivity, the LECs are well ahead of BT and other European operators. For example, RHC access lines per employee now average 181, a 20% improvement since 1984.

Why is incentive regulation more appealing than rate-of-return regulation? LEC management wants to provide cost-effective service. But cutting the *next* 20% of costs is much more difficult than cutting the first 20%. LECs do not have the incentive under rate of return to take on increasingly difficult cost-reduction efforts that could jeopardize employee morale, union relations or customer satisfaction. Those carriers that have gone this extra mile have been forced by regulators to refund all the savings to customers because returns climbed above allowed ranges.

In addition, the lion's share of the potential value LECs could create does not come from cost reduction. It comes from new services that require inherently risky investments in new network capabilities like switched broadband and in the critical mass of customer premises equipment needed to provide many new services.

Why should LECs make those kinds of investments with no assurance that revenues will justify them? If they succeed, the LECs, in effect, would break even. They would enjoy no increase in shareholder value because, under current regulation, returns are limited to the cost of capital. If they miscalculate demand, they could find part of their investment disallowed, causing them to destroy shareholder value.

This is not just a theoretical concern. A similar problem has plagued rate-of-return regulated electric utilities over the past decade. Many companies built new power plants, expecting continued high demand growth. When it did not materialize, regulators penalized some of them by disallowing those costs. Others are still struggling to get those plants into the rate base. And the resulting risk aversion in the industry could lead to regional power shortages in the next few years.

Value creation and incentive regulation

Value is defined as the benefits customers enjoy from services minus the cost of providing those benefits. The portion of value retained by the *customer* is equal to benefits minus price. The portion of value retained by the *local exchange carrier* is equal to the price charged for the service less the cost of producing it.

Total value is created when benefits are increased relative to costs or costs are reduced while maintaining the level of benefits. Benefits can be increased in various ways, including the addition of valued new services, increased penetration of current services, or improved levels of satisfaction among customers with current services.

Price determines how value is shared between the LEC and its customers. A higher price distributes more value to the LEC in profits, but reduces customer value; a lower price does the opposite.

In its simplest terms, the goal of regulators is to maximize customer value. The goal of LECs is to maximize the long-term value created for their shareholders while serving their customers well.

Incentive regulation is a new price-setting mechanism. To be successful it must fulfill the goals of both customers and LECs better than rate-of-return regulation. In other words, it must lead to an increase in total value creation and an equitable sharing of value among the parties.

For similar reasons, many LECs tend to be conservative about revenue-justified investments under rate-of-return regulation. Rate-of-return regulation is "a system that offers little incentive to invest in tomorrow," says Zane Barnes, chairman of Southwestern Bell Corp.

Incentive regulation, on the other hand, can motivate LECs to take the risks necessary to create additional value. If LECs are allowed to reap higher rewards and if agreements are in force long enough to allow them to recoup the cash outlays required for investment, they will be more likely to invest in new capabilities, bite the bullet on cost reductions and think more creatively about service improvements. The impact on managers will be subtle, but real. Suddenly, the game will be about management skill and aggressiveness. Conservatism may no longer be the name of the game.

The word *may* is important. Incentive regulation *may* lead to those things. But it may not. For incentive regulation to work, LECs must do what BT has done—be more efficient and innovative than they have been in the past.

If they do not, incentive regulation will fail to satisfy regulators, to say nothing of skeptics like the Consumer Federation of America. The CFA believes that incentive regulation will *not* create new value, but instead is an attempt by the industry to "deny ratepayers a fair share of the efficiency and productivity gains that have consistently driven network cost and thus the price of basic service down."

To Share and Share Alike

If BT's experience is any guide, the second challenge for carriers is to ensure that both customers and shareholders get a fair share of the value created. They can begin by designing value-sharing provisions for the incentive regulation initiatives at state levels and by influencing the FCC's price-cap program, which is still under review. Once the program is under way, they can also actively manage the sharing of value.

Through pricing policy, LECs can ensure that customers are treated fairly during an agreement's framing and execution. LECs and regulators must fashion the "price promise" so it not only provides adequate incentive, but also leads to demonstrably lower bills.

But the effort should not end

there. As an incentive program evolves, the LEC should suggest changes to the program if it does not appropriately distribute the value created across all customer classes. As BT learned, if regulators are not satisfied with how value is being shared, they can unilaterally adjust parameters such as price caps to capture more value for all customers or just for specific groups.

BT discovered, quite painfully, that service quality was an even more important aspect of value than price. A combination of circumstances that had little to do with incentive regulation unfortunately led to BT's service degradation—antiquated technology, a boom in demand among business customers and a strike. And management's focus on capturing new revenues from business customers kept BT from dealing with its problems as quickly as it should have. As a result, when service problems were at their peak, Oftel considered linking the new price caps to service performance in its next agreement. BT avoided that linkage by pledging service improvements and by offering £5 ($8.45) payments to residential customers and even larger payments to business customers for each day an order was late.

By actively ensuring that customers get their fair share, LECs can minimize the cost and diversion of an adversarial regulatory process. Wayne Allcott, U S West's director of public affairs, estimates the cost of federal and state regulation at $1 per access line per month. If extrapolated across the industry, this translates into $1.5 billion a year, a cost that incentive regulation might substantially reduce.

The Bottom Line

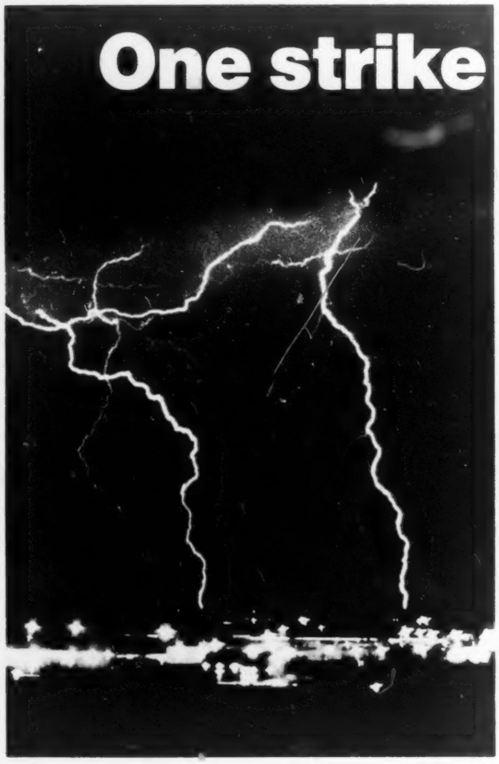
Incentive regulation is not a luxury. It is a necessity for LECs that want to continue to outperform the stock market. Most LECs are at least experimenting with incentive regulation. They must now decide whether or not to commit to changing the price-setting mechanism permanently.

It would be nice if the BT story was an unqualified success—that incentive regulation helped BT outperform U.S. telephone companies on every measure. Unfortunately, that has not happened.

Even with its flaws, the BT program has succeeded and provides a useful laboratory model. Using this model, LECs can begin to understand the nature of the role they must play. It is not enough to simply be willing participants; they must be enterprising leaders in creating and sharing value.

Incentive regulation has a win-win potential if approached in that spirit. It can transform the industry into a more exciting, innovative and efficient business. As William H. Springer, Ameritech's vice chairman and chief financial officer, says, "Price regulation appears to be one of those rare ideas that really does have something for everyone." T

David L. Werner is a Director of McKinsey & Co. Inc., Atlanta. Subsequent articles will examine switched broadband opportunities and unregulated ventures.



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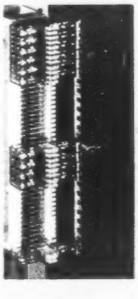

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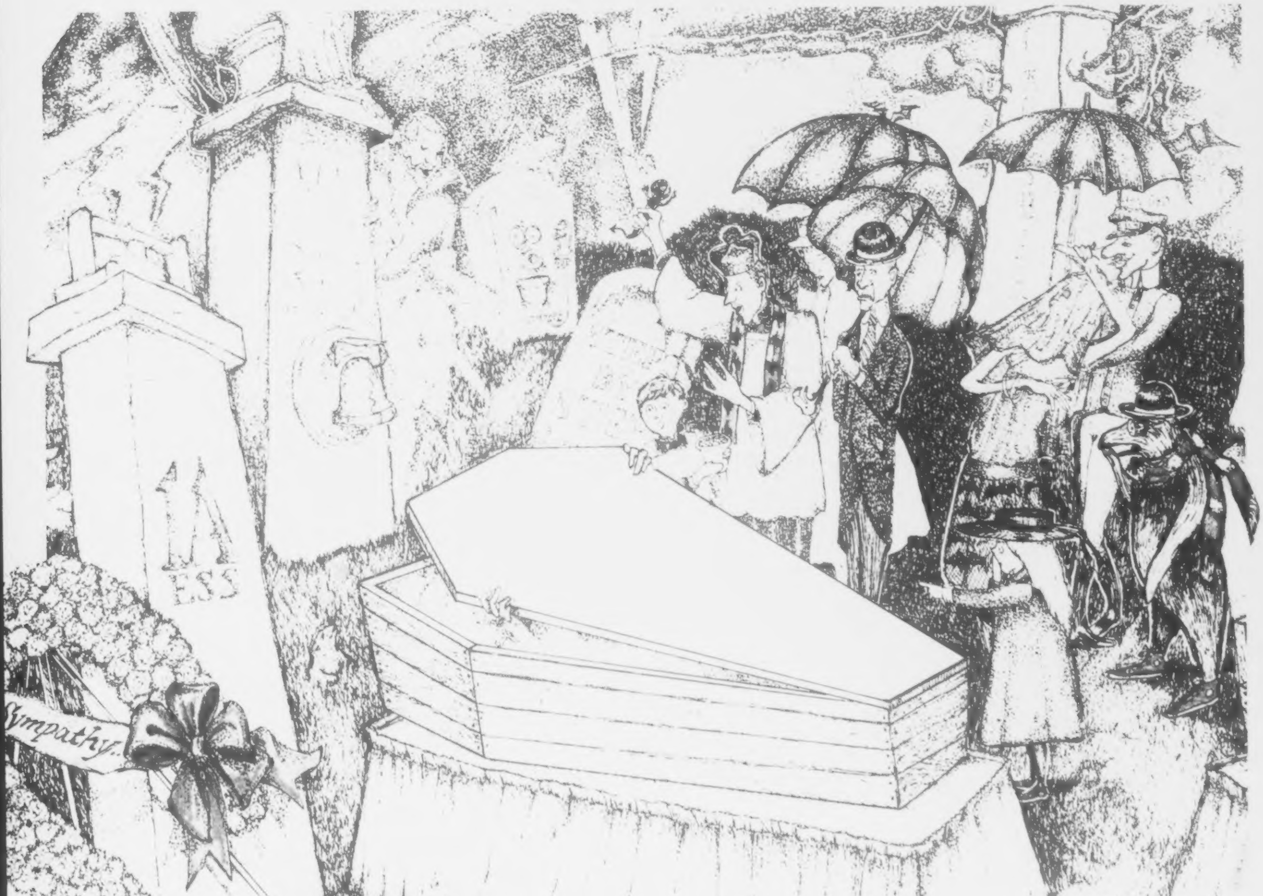

IT'S NOT DEAD YET! Rumors of the demise of the feature-rich 1A have been greatly exaggerated

CALIFORNIA HERE WE ARE
Take a peek inside for a preview of this week's SUPERCOMM show

READY FOR ESIDENTIAL BROADBAND?
Every large LEC should already have a broadband plan on the drawing board

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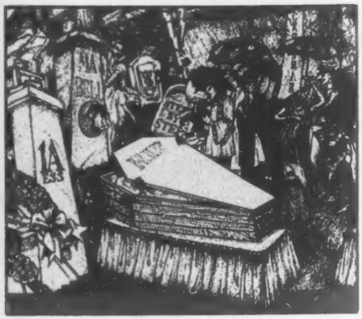
Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



"Rumors of my death have been greatly exaggerated." Although this sentiment was uttered by Mark Twain, BOC managers feel the same way about their workhorse 1AESS analog switches. They're certainly not dead yet!
Cover art by Laura M. Doyle

DEPARTMENTS

170 ADVERTISERS' INDEX
6 IN MY OPINION
36 MEETINGS
152 MERITS AND MILESTONES
172 MOVING AROUND INDUSTRY
154 NEW PRODUCTS AND SERVICES

NEWS OF THE WEEK

10 SUPERCOMM '89 FEATURES DIGITAL SERVICES
Broadband switching and advanced digital services will highlight the Anaheim show, which is expected to draw 20,000

10 STROMBERG PLANS BROADBAND TRANSITION
Stromberg-Carlson and parent GEC-Plessey Telecommunications announce a joint CO switch development program

11 UNISYS UNVEILS NEW DATA PLATFORM
The company says its advanced network server will help telcos unify diverse computer operating systems and networks

FEATURES

38 IS BIGGER BETTER?
By Tom Fermazin. It's agreed. CO-based voice messaging systems must be large to provide low-cost services. But is the sky the limit?

46 ARE U.S. COMPANIES MISSING THE BOAT?
By John Williamson. When the dust settled on the Bell breakup, Europeans expected the RHCs to charge in and settle new territory—in Europe. But, to their surprise, the spaghetti western scenario never really materialized

62 THE CRITICAL UMBILICAL
By Andrew Alexander. Businesses want to enjoy the joys of rural life, but don't want to cut the fiber cord to the digital world

72 THE OLD 1A—IT'S NOT DEAD YET!
By William Church. Rumors of the analog switch's demise have been greatly exaggerated, according to BOC managers reluctant to part with this feature-rich workhorse

84 ARE YOU READY FOR RESIDENTIAL BROADBAND?
By David L. Wenner. Its possibilities boggle the mind. But can LECs make residential broadband a success? Installation costs could be just as mind-boggling

106 FEETS DON'T FAIL ME NOW!
By Karen Woodward. SUPERCOMM '89/Network 90's transforms the Anaheim Convention Center into a dazzling telecommunications magic kingdom this week. A preview of products to be displayed in Anaheim starts on page 108

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Are you ready for residential broadband?

DAVID L. WENNER

The possibilities boggle the mind.

Viewers can select movies or past sporting events from a vast library of titles and watch them when convenient. Children can "own" an entire catalog of arcade games. Shoppers can tour their favorite malls on video, enter stores at will, call up demonstrations of interesting products and place orders for home delivery—all without the hassle of driving, parking or fighting the crowds.

The technology for bringing these applications and a multitude of others to the home is switched broadband, which will be ready for deployment in the 1990s. This marriage of switched voice, data and video transmission that it makes possible will open up the opportunity for on-demand, interactive services to the general public. And that development will change the telephone business in ways we've only begun to perceive. This technology will reach the marketplace at a critical time for local exchange carriers—when they need profitable growth to maintain their current high levels of stock market performance *(Telephony, Jan. 2, page 24).*

Businesses clearly will provide a market for broadband data transmission services, but can LECs make residential broadband a success? It's an important question because of the financial ramifications: installing a nationwide residential broadband network in only half of U.S. residences could cost as much as $100 billion.

> *Shoppers can tour their favorite malls on video . . . without the hassle of driving, parking or fighting the crowds.*

Residential broadband can succeed, and LECs can play a leading part in its development. To make that happen LECs must give as much attention to the strategic challenges of broadband as they and their suppliers are giving to its technical aspects. Otherwise, switched broadband could take twice as long to develop and LECs could find themselves locked out of all but basic transmission.

Revenue Streams

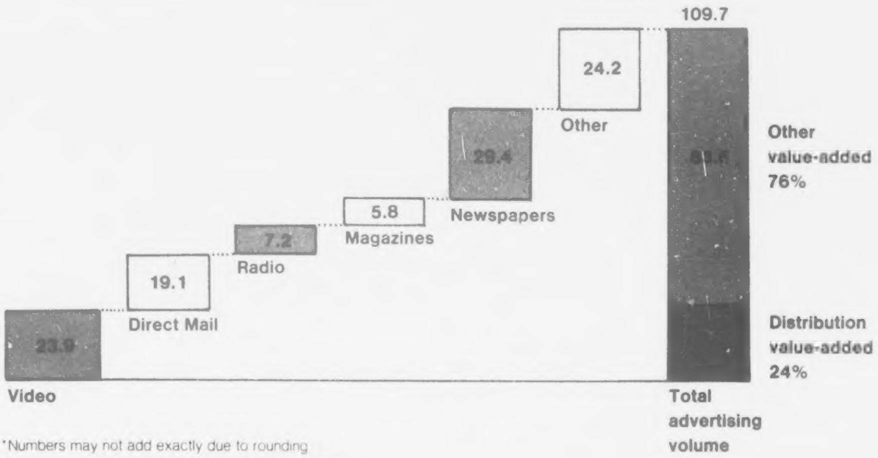
Although there is substantial uncertainty about demand, we estimate the annual revenue potential for residential broadband distributors to be between $35 billion and $80 billion when 50% of the U.S. households are wired (see story on page 99). The top of that range approaches the total revenues of all the LECs last year. This estimate would be significantly higher if the revenues associated with content provision were included.

The most obvious and largest

continued on page 86

FIGURE 1 U.S. ADVERTISING VOLUME BY SOURCE – 1987*

$ Billions



*Numbers may not add exactly due to rounding

Source: McCann Erickson Inc., McKinsey estimates source of revenue is from end-user charges, which could provide broadband distributors with an incremental revenue stream of between $16 billion and $40 billion. Not only can broadband supply consumers with all the entertainment services they now receive from cable and broadcast TV, it also can substitute for movie rentals from the neighborhood video store. And it can create new markets for information services and make videophone a reality.

The typical household receiving switched broadband services probably would spend about $75 a month for these services. This is about twice what the same household spends today on video entertainment for the home.

A second source of revenue for broadband operators will be provided by transaction services, which could provide between $5 billion and $15 billion in additional revenues. These revenues will come from retailers and intermediaries that will share a portion of their margin on goods and services purchased by consumers and pay fees for other customer services. Home shopping is a prime example, but banking and services such as reservations also are likely to be involved. Our revenue estimates are based on modest assumptions about the penetration of these services.

A third source of revenue is highly targeted advertising. In fact, the phrase "highly targeted" is an understatement. Broadband offers the ultimate in targeting—the ability to direct advertising to specific individuals. During a movie intermission, a boat owner can be shown marine accessories while a gardener, watching the same movie, can see lawn care equipment. As a result, the cost of reaching each targeted consumer should be far lower than in broadcast, making broadband attractive to advertisers who want to reach specific market segments. The trend toward product/market segmentation has made targeted marketing imperative. For example, Quaker Oats now has 30 brands of cereal, compared to only seven in 1969.

> *Installing a nationwide residential broadband network in only half of U.S. residences could cost as much as $100 billion.*

With the capability to reach specific market segments, broadband has the potential to claim a share of television advertising, direct mail and even some print advertising. All types of advertising totaled nearly $110 billion in 1987 (Figure 1). Allowing for growth in advertising revenue, if broadband reaches half of U.S. households, it can capture between $14 billion and $25 billion in advertising revenue. That includes 35% to 55% of all video advertising, 10% to 25% of direct mail advertising and 1% to 5% of print media advertising (Table 1).

TABLE 1 DISTRIBUTION VALUE-ADDED: ADVERTISING **Estimate**

Type of advertising	Distribution value-added—1988 $ Billions*	Share Percent	Assumptions
Video advertising	9-14	**35-55**	**Broadband will substantially displace cable TV. Networks will retain a majority of national advertising, but broadband will capture a large share of *local* advertising due to targeting capability**
Direct mail	1-3	**10-25**	**Moderate share will be captured due to targeting capability of broadband**
Radio, magazine, newspaper	0-2	**1-5**	**Broadband has limited substitution potential since these media meet different consumer needs from video**
New advertising	4-7	**100**	**New advertising will be stimulated by targeting capability**

*Calculated based on current revenues plus 15 years of growth, except for new advertising

If these estimates are accurate, broadband offers a revenue stream that is large enough to cover the $100 billion investment the LECs would have to make.

Name Your Game

Although a number of variations are possible, there are four principal roles an LEC can play in delivering the additional services possible with broadband technology: transporter, gateway, distributor and fully integrated provider.

The most basic role is transporter. The LEC would install and maintain the network and supply bandwidth and some switching capability to service providers. It would not add any additional value and would have little direct contact with end users. This role is similar to the role currently played by long-distance "carriers' carriers," such as Williams Telecommunications Group and Consolidated Network.

The transporter role is permitted by regulation and is already being provided to cable TV companies in a limited way by several LECs, including Ohio Bell in

continued on page 88

Cleveland and Chesapeake & Potomac Telephone Co. in Washington, D.C. A trial also is being conducted by Bell of Pennsylvania in Perryopolis. The LECs will at least play this basic role in broadband. The question is whether or not they will take a more significant role.

Acting as a gateway is the next step beyond simple transport. This role adds new functions and significant end-user contact (see story on this page). An LEC would integrate the activities of content, transaction and advertising service providers, supply necessary "host" information such as program menus and possibly have a major role in marketing, billing and customer support.

This role is roughly analogous to the narrowband "information gateway" role now being played by companies such as Compuserve and Prodigy and being tested by several Bell regional holding companies. In this role an LEC would not own any of the content transmitted to customers, but it would be viewed as the principal broadband provider by the majority of its customers. It would thereby acquire considerable bargaining leverage with content providers and advertisers, and strengthen its ties to current customers.

There are two other roles an LEC could play: distributor or fully integrated provider. The distributor role encompasses the transporter and gateway functions and adds content ownership. For example, LECs could legally own the content they provide just as cable companies now do, and could also maintain video libraries and information databases to offer to customers along with similar services provided by others.

As a fully integrated provider, an LEC would participate in content development, ranging from creating local databases or programming all the way to owning a

continued on page 97

The good and bad news about gateways

The gateway role provides a good example of the complex infrastructure and producer/intermediary/customer relationships that must be formed to support broadband applications. The gateway will have to deal with end users and also establish business relationships with a wide range of suppliers, such as entertainment libraries and information databases, transaction services companies and advertising providers. In addition, the gateway may negotiate arrangements with existing cable operators and national and local broadcast networks to obtain access to a wider range of programming and share advertising revenues.

Although there will always be several channels of information and entertainment available to consumers, broadband gateways could eventually handle the majority of value-added flow. The switching capability of the gateway makes it superior to existing cable and broadcast distribution because it can provide interactive access to multiple entertainment, information and communications applications, all available on demand.

Nevertheless, broadband gateways will still compete against broadcast and cable companies for both customer and advertiser revenues.

FIGURE 2 SERVICE FLOW FOR GATEWAY ROLE

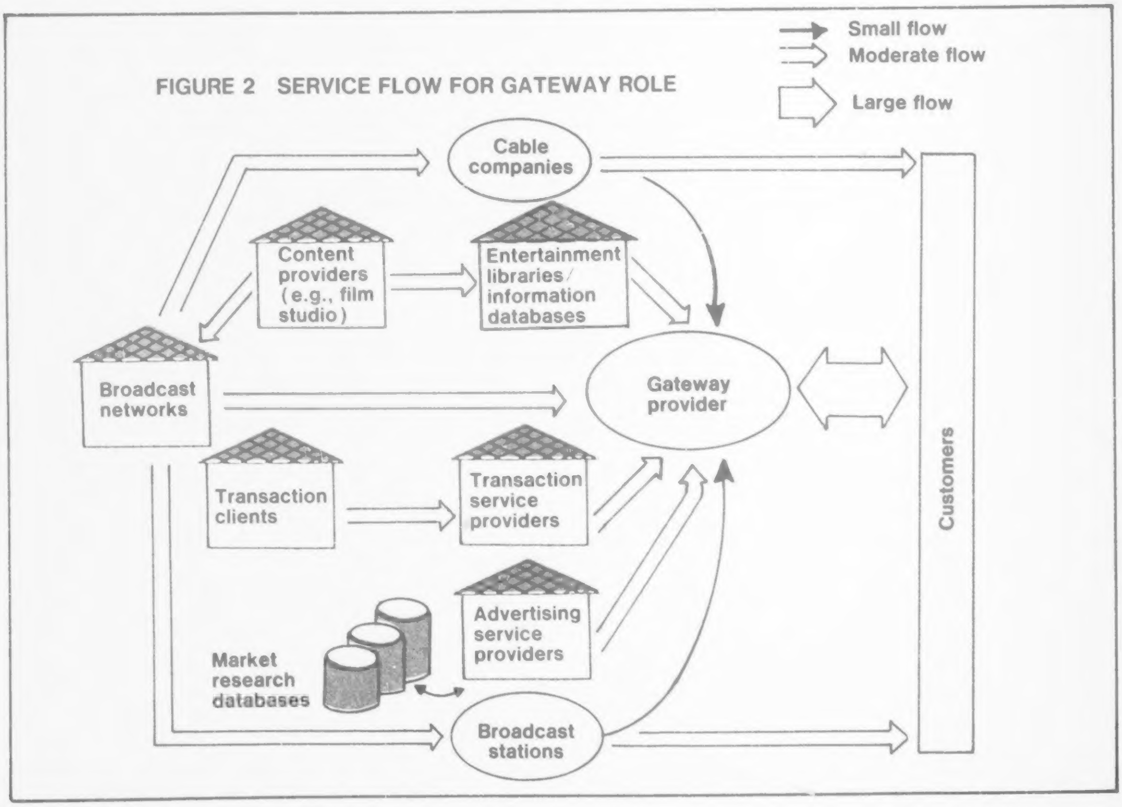

Small flow
Moderate flow
Large flow
Cable companies
Content providers (e.g., film studio)
Entertainment libraries/ information databases
Broadcast networks
Gateway provider
Transaction clients
Transaction service providers
Advertising service providers
Market research databases
Broadcast stations
Customers

FIGURE 3 BROADBAND ROLES AND CHALLENGES

- ● Major challenge
- ◑ Moderate challenge
- ○ Minor challenge

Functions performed	Transporter	Gateway	Distributor	Fully integrated provider
- Transmission	✓	✓	✓	✓
- Customer billing and service		✓	✓	✓
- Customer marketing		✓	✓	✓
- Integration of content provider and advertiser activities		✓	✓	✓
- Ownership of content			✓	✓
- Development of content				✓
Challenges				
Legal/ regulatory				
- MFJ			●	●
- 1984 Cable Act		◑	●	●
- Possible "must carry" provisions		◑	◑	◑
- Rate-of-return regulation	◑	◑	◑	◑
Competitive				
- Existing competitors	◑	●	●	●
- New entrants	○	◑	◑	◑
- Lock in content	○	●	●	●
Technology	◑	◑	◑	◑
Skill-building	○	◑	●	●
Creation of infrastructure	◑	◑	◑	◑

Are You Ready *continued*

film production and distribution company. In cable TV, Time Inc., the second-largest multiple-system operator, plays this role. Time has 4 million cable subscribers, owns two movie channels—Home Box Office and Cinemax—and produces some of the films offered by these channels.

These roles are still largely conceptual. As debates continue on regulatory and competitive issues, these roles will become clearer. The important point is that each LEC must decide what role it will play in delivering broadband services.

Strategic Challenges

Aside from the obvious marketing and technological challenges of developing a viable switched broadband business, an LEC will face five other distinct but related strategic challenges: legal and regulatory, competitive, technological, skill-building and infrastructural (Figure 3).

All LECs, but especially the RHCs, face major legal and regulatory challenges in pursuing broadband. The Modified Final Judgment and the Cable Act of 1984 represent the greatest restrictions. The MFJ forbids the RHCs from being either "distributors" or "fully integrated providers" because of its prohibitions against providing content. The Cable Act prohibits all LECs from playing these roles because it classifies those who provide video content over wired networks as cable companies and then expressly forbids telephone companies from owning cable companies that operate within their telephone service areas.

Federal Communications Commission regulations under the Cable Act further restrict LECs from anything but arms-length relationships with content providers, though the FCC recently proposed softening this restriction to allow minority stock ownership, joint ventures and other alliances.

A less apparent obstacle lies in another aspect of the Cable Act that could dramatically slow the development of switched broadband gateways and be a disadvantage for LECs. Since video content providers are classified as cable companies when they operate through gateways instead of through distributors that own content they will have to obtain cable franchises from each of the local municipalities they want to serve. This process could be extremely time-consuming and costly, especially if contested by the

continued on page 100

Estimating revenue potential

It is impossible to project broadband revenue potential with great accuracy since the applications are new and will develop over a period of decades. Nevertheless, to provide a starting point for a company's own in-depth analysis, we have made a first, rough estimate of the revenues likely to be associated with distribution of broadband services. These revenues do not include payments to content providers.

We constructed a "revenue tree" that broke the revenue potential into components and sub-components. For each sub-component we then estimated the total revenue, the distribution portion of this revenue and the likely broadband share (see figure below). Finally, we gathered publicly available information on market sizes and growth rates and estimated broadband distribution revenues for the next 15 years, in today's dollars.

Here is an example of this process for one of the components—entertainment services—to clarify our approach. To estimate the total distribution revenue potential of entertainment services, we examined the historical growth rates of existing services that are similar to what would be offered over broadband. These include basic cable, pay cable, home video sales and rentals, movie theater receipts and game cartridge revenues.

For example, basic cable services generated about $6 billion in revenues in 1987, up from $3 billion in 1987 dollars in 1982, indicating a real growth rate of 15.6%. We then estimated the future growth rate of each service, depending upon our view of the market demand. For basic cable we used 7%, or about half of the historical rate, because it was consistent with a saturation level of 70% of households and a slowing of real price increases. Applying these individual growth rates, the total future revenue estimate for all entertainment applications fell between $67 billion and $107 billion.

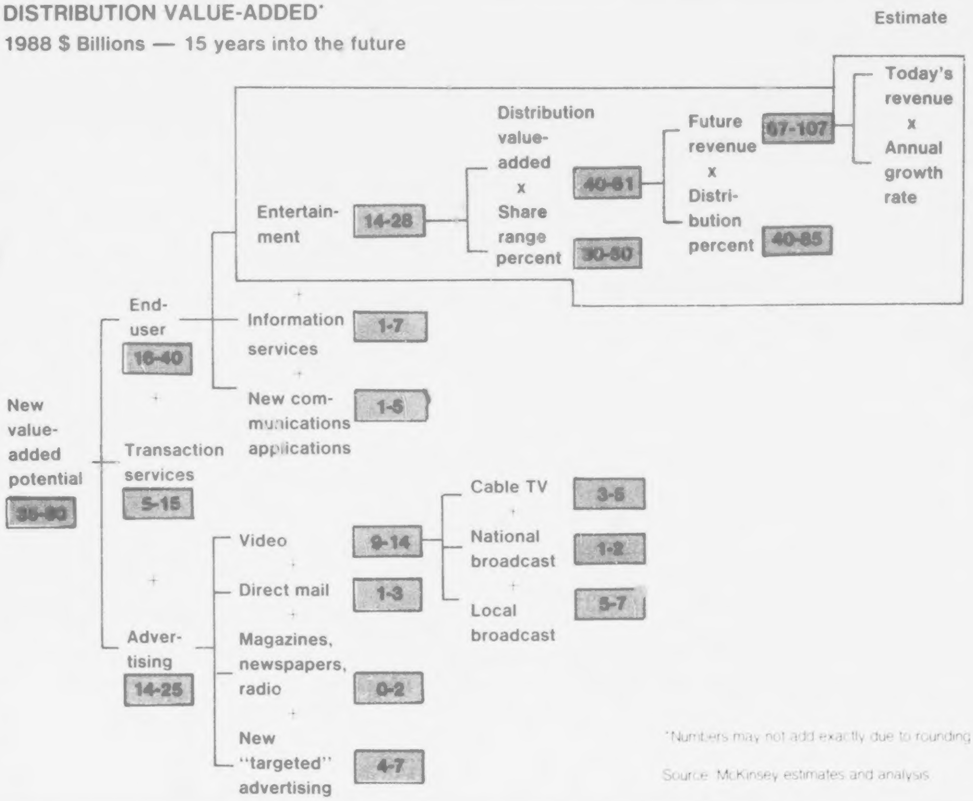
We then estimated distribution value-added percents for each entertainment category using gross margin as a proxy. Gross margins range from 40% to 85% across entertainment applications, and when we applied the appropriate mix, we were left with a distribution value-added of between $40 billion and $61 billion for entertainment as a whole.

Next, we determined a possible share range for broadband given that its entertainment applications generally are superior to similar services available today (that is, movies on demand rather than through local rental outlets). We assumed various shares for broadband depending upon its attractiveness relative to existing services. Individual shares varied from zero (movie theater receipts) to between 38% and 50% (video sales and rentals), with the aggregate share range ending up between 30% and 50%. When we multiplied this share range by the distribution value-added range we ended up with a total for entertainment revenues of between $14 billion and $28 billion.

Other applications summarized below were established similarly.

DISTRIBUTION VALUE-ADDED*

1988 $ Billions — 15 years into the future



Estimate
Today's revenue x Annual growth rate
Future revenue
67-107
x
Distribution percent
40-85
Distribution value-added
40-61
x
Share range percent
30-50
Entertainment
14-28
+
Information services
1-7
+
New communications applications
1-5
End-user
16-40
+
Transaction services
5-15
+
Advertising
14-25
Video
9-14
Cable TV
3-5
+
National broadcast
1-2
+
Local broadcast
5-7
+
Direct mail
1-3
+
Magazines, newspapers, radio
0-2
+
New "targeted" advertising
4-7
New value-added potential
35-80

*Numbers may not add exactly due to rounding

Source: McKinsey estimates and analysis

current cable franchise. This possibility is especially onerous for LECs because they are precluded from being distributors and owning content while others are not.

> *Broadband offers the ultimate in targeting—the ability to direct advertising to specific individuals. During a movie intermission, a boat owner can be shown marine accessories while a gardener, watching the same movie, can see lawn care equipment.*

An additional constraint that may affect the attractiveness of broadband gateways is the possible reinstatement of provisions by the FCC or Congress that would require them to carry broadcast programming and advertising without charge.

Finally, the continuation of rate-of-return regulation could discourage rapid construction of a broadband network by LECs. Although the FCC may seek to deregulate all broadband activities except transport, the transport function is likely to remain under price regulation, especially if the same network carries broadband services and basic telephone service. Whether or not broadband transport will be attractive enough to warrant aggressive development, as opposed to a more cautious approach, will depend heavily on the evolution of regulation and whether sufficient incentives are built in to reward risk-taking. Also at issue is whether regulatory mechanisms such as allowance for funds used during construction, or AFUDC, can bridge the gap between initial investment and significant revenue generation.

Competitive Pre-emption

Another equally important challenge exists in the competitive arena. The first threat comes from competitive reactions of existing cable and broadcast companies. These companies have high fixed costs and low marginal costs, so they probably will price aggressively to retain their market share. This action could substantially delay the profitability of broadband gateways.

In addition, it is likely that some of the larger cable companies will move aggressively into fiber and possibly to switched broadband networks. J.C. Sparkman, executive vice president and chief operating officer of Telecommunications Inc., says his company will invest several million dollars during the next few years to upgrade its systems with optical laser transmitters and AT&T optical fiber. American Television and Communications and Cablevision have made similar commitments to fiber.

New entrants to the residential communications market may pose an additional threat. For example, AT&T recently asked U.S. District Judge Harold Greene to follow the MFJ's original schedule that would allow restraints on its provision of information services to the home to expire. Freed of regulatory constraints, AT&T might wire some of the most desirable communities, gain the broadband-related revenues from these customers and simultaneously avoid payment of long-distance access charges to the LECs. Other companies, such as IBM, already are in information services and may also choose to play a national gateway role in broadband.

Another pre-emptive threat

continued on page 103

Developing a broadband plan

Although deployment of switched broadband is still a number of years away, every large LEC should already be developing a broadband plan. This plan should contain the following elements:

A fact-based point of view on the industry's future and how LEC action can influence it.

- *Demand.* LECs should go beyond basic analysis and study current usage and underlying customer needs and behavior to more carefully size the potential to understand how to prioritize and sequence development.
- *Regulation.* They also should get involved with the regulatory process. In particular, what can LECs do to remove the restrictions of the Modified Final Judgment and the Cable Act of 1984? How can they influence which broadband roles will be price-regulated? How can they help define incentive regulation in a way that makes the investment attractive enough to pursue aggressively?
- *Industry structure.* Because a core of broadband revenues may be generated at the expense of the existing broadcast and cable industries, broadband probably will trigger a restructuring of these industries. It also will create new sub-industries of information, entertainment and transaction content providers. To anticipate and influence this restructuring to their advantage, LECs must first understand how current information and entertainment providers will be affected under different scenarios of broadband development, what actions they could take to protect or strengthen their position, and who the new entrants are likely to be.

Each of these issues will have significant regional variations due to demographic differences, unique regulatory situations and specific local competitors.

An articulation of the desired role and its implications.

Because the legal and regulatory challenges, competitive threats and skills needed are role-specific, each LEC must choose a role before it can set priorities and focus its actions. For example, the RHCs might want to become seven identical regional gateways. This action might be coupled with a desire to provide selected information services that are particularly valuable or are unlikely to develop without support, and to influence the development of specialized CPE for these and other applications. This role is much more challenging than just providing local transport and has implications for the regulatory agenda, skill building and infrastructure development.

Strategies and programs for moving forward.

An LEC's near-term strategy will depend on its view of broadband's future and its role in that future. For example, its strategy will determine how quickly fiber is deployed and where. It also will influence the extent and the nature of desired cooperation with broadcast networks, and with cable companies in its service area.

could come from potential competitors, such as cable companies and the entertainment networks, that build links to information or entertainment providers to lock in the supply of content. That threat is particularly keen in entertainment, which is concentrated among a small group of suppliers. In 1986 the top five studios had a 60% share of box-office movie receipts.

The recently proposed merger of Warner Communications Inc. and Time Inc. raises exactly that concern. As a major distributor of cable entertainment, Time is trying to ensure continued access to good programming. While such moves cannot deny entertainment content to the LECs indefinitely, they could delay switched broadband's growth and make it difficult for LECs to earn adequate returns.

Technology Threat

New technology also is a threat.

Electronic processing and storage technology is advancing rapidly. For example, in 15 years a home computer might be coupled with CD-ROM and video disc technology to store massive amounts of information and entertainment on-line at a modest cost. When coupled with more efficient home distribution of media and narrowband links for transaction processing, this combination could compete with broadband. For example, "electronic catalog stores" could provide full-motion video shopping by distributing video discs by mail and processing orders over a low-speed network or the telephone system.

To be successful with switched broadband LECs must build the necessary corporate skills. LECs already know how to construct and maintain complex networks and provide accurate bills and good customer service. With continued evolutionary development, LECs can use these skills to become transporters of broadband.

To play any other role, LECs must develop new skills. To provide gateway service, for example, an LEC would have to establish a complex data network, provide and bill for many additional services, face more difficult marketing challenges and develop relationships with many content providers.

Further integration would require new skills ranging from database management to entertainment programming and talent procurement. Developing superior skills in any one of these areas would be a challenge; taken together they represent a decade or more of dedicated effort.

Which Came First?

An even greater challenge than developing new skills is ensuring that the appropriate infrastructure is there when needed. Here the LECs face a classic "chicken-and-egg" problem: They must simultaneously develop a market and its supporting infrastructure. In anticipation of demand, they must not only provide the network, but also ensure that a sufficient variety of applications and customer premises equipment is ready to make broadband valuable to a critical mass of customers. In addition, a whole new generation of information processing software must be developed to link information and transaction providers to gateways, measure usage and support targeted advertising.

Given the high stakes involved, every large LEC should develop a broadband plan that begins with a carefully calculated view of future demand and an assessment of regulatory issues and potential industry structure.

Even if regulatory restrictions are removed, LECs will not be able to provide all of these critical elements themselves. They must, at the very least, cooperate with other industry members to develop common objectives and network interface standards. It will become even more of a challenge as LEC competition heats up.

If LECs want to act as gateways, they must agree on a common gateway architecture and perhaps even on identical gateways. And they must work with equipment manufacturers and information and entertainment suppliers to provide guidance, encouragement and possible financial incentive to invest ahead of customer demand.

Development of a broadband infrastructure is similar to the problem faced by the French when Minitel was developed. The problem is much greater, however, because of the fragmentation of the U.S. telecommunications industry and the scope of the effort.

Gearing Up

These challenges are not insurmountable, but they must be addressed if LECs are to reap the potential monetary rewards broadband offers. Clearly, decisions being made today will affect the shape of the switched broadband industry. Some LECs are deploying fiber more aggressively than others. Key legal and regulatory issues are being debated. Cable companies are making potentially pre-emptive moves and the entertainment industry is consolidating.

Given the high stakes involved, every large LEC should develop a broadband plan that begins with a carefully calculated view of future demand and an assessment of regulatory issues and potential industry structure. The plan should articulate the role the LEC wants to play and strategies to move forward (see story on page 100).

These efforts, although time-consuming for LECs, are essential because switched broadband offers enormous growth potential. The time to address these challenges is now—even though the market potential is unclear and technical issues are not yet resolved. ■

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Telephony

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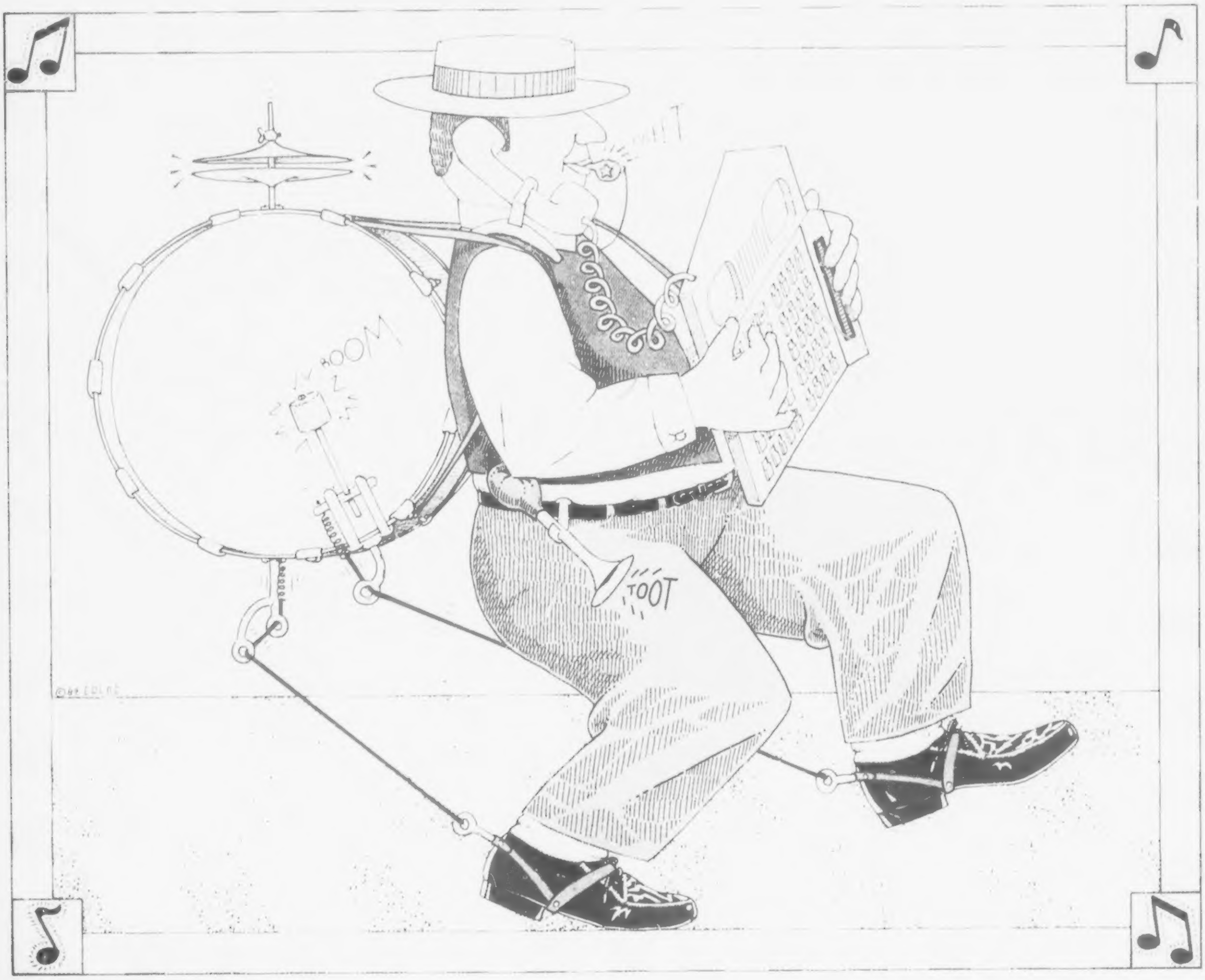

AND THE BAND PLAYS ON

Key systems are the one-man bands of the telecom world

BROADBAND DRAWS MIXED REVIEWS IN ANAHEIM

Fujitsu, Northern reveal plans while others take a more cautious stance

CWA, IBEW THREATEN STRIKE AGAINST AT&T

AT&T remains optimistic that strike can be averted

MONDAY, MAY 29, 1989 Volume 216, No. 22

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

What's the beat on the street? It's the key system, the one-man band of the telecom world, loaded down with capabilities once provided only by larger or multiple systems.
Cover art by Jim Colao

NEWS OF THE WEEK

8 **BROADBAND DRAWS MIXED REVIEWS**
The SUPERCOMM '89 spotlight was on broadband switching with the technology drawing some criticism as well as support

9 **CWA, IBEW THREATEN STRIKE AGAINST AT&T**
The unions voted overwhelmingly to authorize a strike should the company fail to present a fair contract

9 **U S WEST KOs SOFTWARE VENTURE**
Citing disappointing marketing and sales results, the company decides to do away with its operator services software venture

15 **WEEKS RETIRES FROM AT&T NETWORK SYSTEMS**
The company's president surprised his colleagues in announcing he will retire from his post July 1

FEATURES

23 **THE UBIQUITOUS PROTOCOL ANALYZER**
By Robert Coackley. They're everywhere, they're everywhere! With the aid of advanced protocol analyzers, the computer networking and telecommunications worlds are edging closer together

30 **AND THE BAND PLAYS ON**
By Deborah Pfeiffer. Amazingly enough, you can get a marching band sound, complete with drum beats, whistles and toots, from a one-man band. Key systems are the one-man bands of the telecom world, providing capabilities once only associated with larger or multiple systems

DEPARTMENTS

54 ADVERTISERS' INDEX
6 IN MY OPINION
18 LETTERS
19 MEETINGS
34 MERITS AND MILESTONES
56 MOVING AROUND INDUSTRY
36 NEW PRODUCTS AND SERVICES

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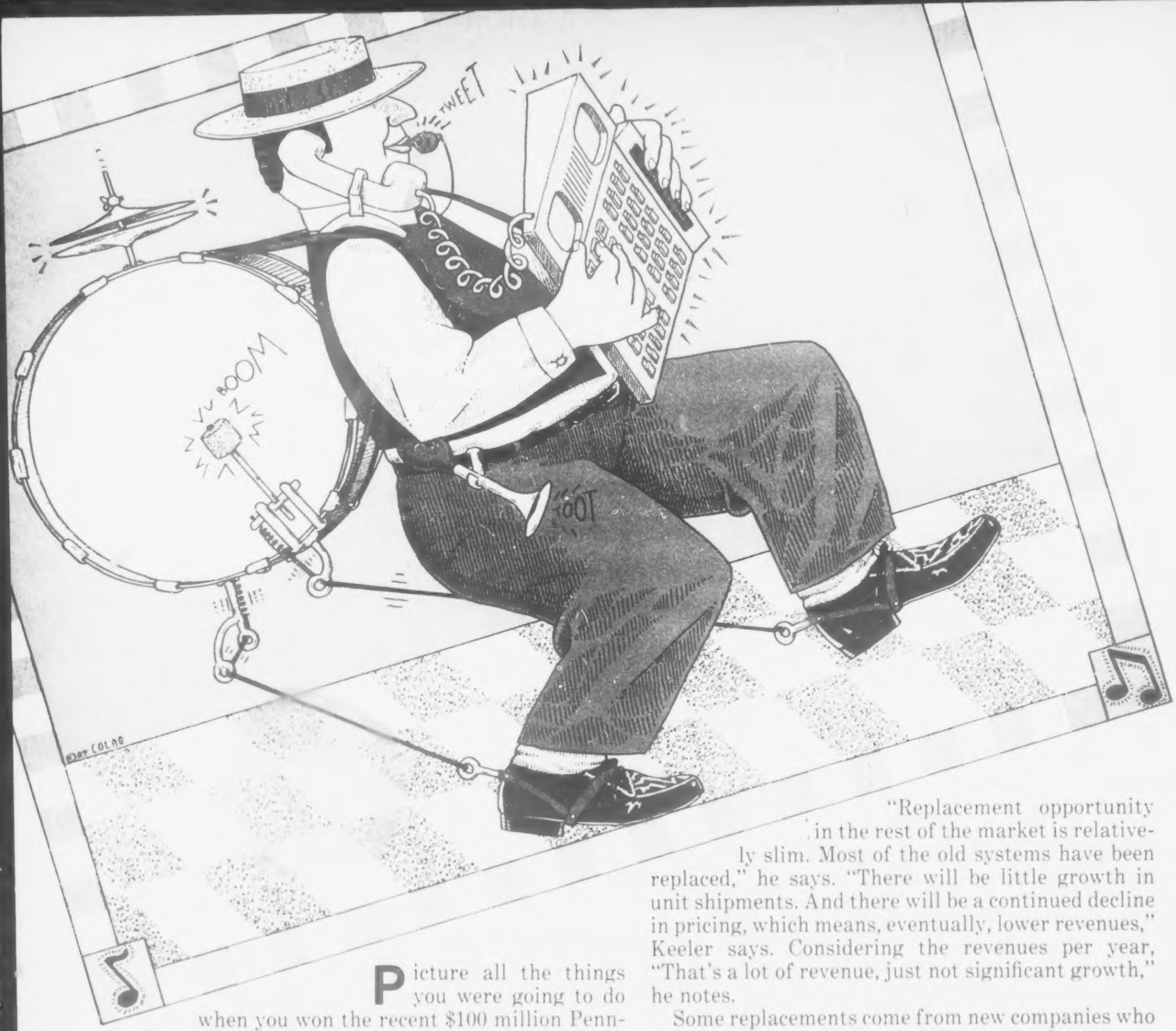


And the band plays on

A one-man band produces the sound of a marching band complete with the bang of a drum. Key systems provide features in the same way, loaded down with capabilities once performed only by larger or multiple systems

DEBORAH PFEIFFER, Associate Editor

Picture all the things you were going to do when you won the recent $100 million Pennsylvania lottery. Now imagine what you'd do with 15 times that amount. Mind-boggling, isn't it? The key system market generated roughly that same amount—$1.4 billion in retail buyer revenues—in 1988, according to Northern Business Information/ Datapro.

Those revenues are nothing to scoff at. But 1987 retail buyer revenues for key systems were also $1.4 billion, meaning the market is relatively flat.

"The key system market is stagnant. It's expected to remain stagnant or flat over the next five years. For 1988, growth is at about ½ of 1% for stations shipped. Revenues are declining," says Dave Keeler, industry analyst for Dataquest.

The market is extremely mature and largely saturated, so there is little opportunity in the market, in Keeler's assessment. The bulk of the market is replacements. The high end of the market—the larger size systems—is predominantly being taken over by PBX systems, he says. In 1986 and 1987, growth predominantly was driven by the emerging low-end market, defined as less than five stations per system. But for 1988, that market also looks saturated, Keeler maintains.

"Replacement opportunity in the rest of the market is relatively slim. Most of the old systems have been replaced," he says. "There will be little growth in unit shipments. And there will be a continued decline in pricing, which means, eventually, lower revenues," Keeler says. Considering the revenues per year, "That's a lot of revenue, just not significant growth," he notes.

Some replacements come from new companies who need small systems, explains Harvey Kaufman, executive director of marketing for Siemens Information Systems. "They tend to move a lot and many times feel that it's just cheaper to abandon the old system and buy a new one when they do move."

TIE/communications' Onyx II key system and Onyx III digital hybrid

Playing the Same Tune

Keeler sees little differentiation between products. "Manufacturers seem to be trying to drive a replacement cycle based on digital," he notes. "Digital doesn't really add features to a system; it's more a 'perception' or a positioning factor. Like 'new and improved.' "

Other industry members think digital capability has a weightier role in the market. The key system market *has* been stagnant, agrees Bill Rich, analyst for Northern Business Information/Datapro. But he sees digital functionality infusing new growth into the market. His company predicts 6% growth in terms of shipments per year from 1988 to 1992.

Several companies, mindful of this growth potential, have already introduced new digital models. Just in the last eight months, the industry has seen the introduction of Executone's Isoetec/System 108 key/hybrid/PBX, Fujitsu's Starlog business system, Macrotel's MT80D digital hybrid key telephone system, Nakayo Telecom's KDX-88 key system, Northern Telecom's Norstar M7342 key system, Panasonic's digital business system family, TIE/communications' Onyx II key system and Onyx III hybrid, and Toshiba's Strata DK56 and DK96 key systems.

Most new key systems on the market have similar features, making them almost generic. New features quickly become standard, potentially indicating that the market is price-driven. Digital capabilities, voice mail interfaces, voice-data interfaces, least-cost routing and call detailing are some of newer functions now available or becoming available on most systems.

Unable to differentiate themselves along features lines, manufacturers have been forced to distinguish themselves in their marketing approach. Some offer an entire range of interworking products. Others push their customer service and support, or Centrex compatibility and distribution.

Functions and performance have more meaning for professional businesses requiring larger key systems, says Rich, so some manufacturers have centered on these "premium accounts," stressing customer service and support.

"For example, a law office would need more support than a restaurant. At a restaurant, as long as people can get through on some line and make reservations, that's all they care about. But at a law firm, if attorneys aren't getting calls, the firm gets pretty upset," he says.

"With bigger businesses, functions have more meaning.... Solutions and applications become more important, and there is more interest in special features, such as attendant, detail accounting and voice mail," says Siemens' Kaufman.

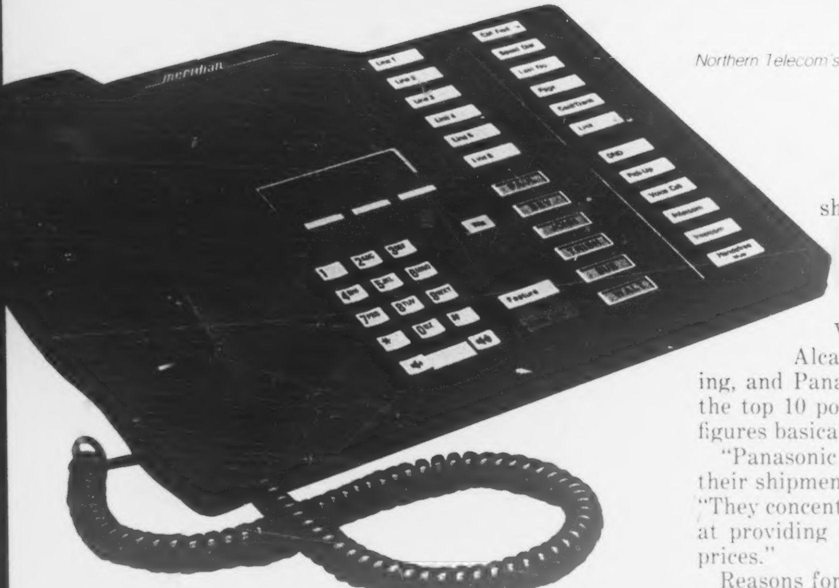
Several companies, including Kanda Telecom, Macrotel, Nakayo, Teledial, Inter-Tel and Eagle Telephonics, are offering small systems compatible with Centrex. Alcatel is also aiming at the lower end of the market, specifically 100 stations and down, and is providing Centrex compatibility.

As Charles Hampton, director of product management for Alcatel Cortelco, sees it, predictions of a flat key system market may be optimistic—, and unrealistic.

"As CO service providers become more in sync with CPE providers and start stressing Centrex services, they will take a significant piece away from the key system market," Hampton says. For that reason, Alcatel plans to introduce a Centrex line of station instruments later this year.

continued on page 32

Inter-Tel's GMX-48 key telephone system



Northern Telecom's Norstar M7324 key system

The Band *continued*

factor in getting ahead in the key system market is distribution.

"Distribution is an important driver of the market," says Rich. To make it in the key system market, he notes, "a company has to have a solid distribution channel and manage it well." In the past, a manufacturer would sell to supply houses or distributors who would manage several brands, leaving the manufacturer with no exclusivity. Many of the top players in the market, according to market share, now directly distribute to end users.

Distribution is a key to whether Siemens, a late entrant in the market, succeeds. When it entered the market last December, the company already had an established distribution network. It has an advantage over other key system hopefuls, says Kaufman, because it distributes directly through Tel Plus Communications Inc., its nationwide network, and through Gold Seal dealers and Associated Siemens Dealers, both independent interconnects.

And with its PBX line, Siemens is a full-line supplier, notes NBI's Rich. "Though it's a tough market, few are positioned to do as well in the market, coming in late," he says.

Too Many Notes

Due to the flat market, consolidation has been a way for manufacturers to increase market share. Manufacturers have bought up distributors to improve distribution. For example, TIE/communications, ranking second in terms of market share (Table 1), has been buying up interconnects, allowing them to sell directly to end users now, says Rich.

Some consolidations also have taken place among manufacturers. Created out of a merger of Isoetec and Vodavi, Executone Communications acquired spot No. 3 in Dataquest's 1988 market share ranking, according to Keeler. With industry consolidation, the number of interconnects and Independents in the market has declined.

Also due to consolidation, market share ranking has not mirrored the stagnant market. According to Dataquest's 1988 market share ranking, based on shipments (not yet available), the Executone merger put the Vodavi and Isoetec systems at No. 3, Alcatel and Iwatsu have dropped in ranking, and Panasonic and Comdial have made it into the top 10 portion from positions 11 and 12. NBI's figures basically back this up.

"Panasonic and Comdial's successes are based on their shipments in small-system sizes," says Keeler. "They concentrated on that and were very successful at providing reliable, good quality systems at low prices."

Reasons for Iwatsu's and Alcatel's drop are more up for grabs. Alcatel's Hampton partially attributes his company's loss of market share to a lack of compatibility between systems. "Each stand-alone system is good on its own, but they aren't compatible," which makes it hard to market the system to companies that want a wide range of interworking systems. He also notes, though, that industry rankings don't take into account electromechanical key telephone systems, of which Alcatel is the largest supplier.

Most of the "one-man bands" are playing the same instruments, making it difficult for any manufacturer to cite one feature that distinguishes its key system from all the others. In fact, the market seems startingly similar to a textbook model of an oligarchic price-driven market, complete with consolidations and mergers.

TABLE 1
KEY TELEPHONE SYSTEM MARKET SHARE FOR 1988
(Based on shipments)

1988	Company
20.8%	AT&T
17.2%	TIE/communications
15.8%	Executone
8.3%	Toshiba
4.7%	NEC America
3.5%	Iwatsu
3.5%	Inter-Tel
3.0%	Fujitsu
2.5%	Mitel
2.3%	Comdial
1.8%	Walker
1.7%	Deka
1.4%	Eagle
1.4%	SMS Group
1.6%	Northern Telecom
1.2%	Telrad
0.4%	Panasonic
1.0%	IBM
1.0%	STC/Asuzi
0.7%	Alcatel/ITT
6.1%	Others
100.0%	Total

Source: Northern Business Information estimates. Copyright 1988/ McGraw-Hill Inc.

Digital key telephone systems, however, are playing the one new melody in the industry. And this new tune may revitalize the market, just as electronic key telephone systems did, replacing the electromechanical 1A2 in years past. The bell may not be tolling for the key system market yet. ■

2

Telephony

AN INTERTEC PUBLICATION JUNE 19, 1989 INTEGRATING VOICE & DATA COMMUNICATIONS $3

WHAT WILL TOMORROW BRING?

U S West is blazing its own trail to the future Sonet-based network

SIKES NAMED FCC CHAIRMAN

NTIA chief nominated by President Bush

GREENE REJECTS BELL INFO PLANS

Judge says RHCs would destroy independent info service providers

MONDAY, JUNE 19, 1989 Volume 216, No. 25

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

There's no clear-cut trail leading to the future Sonet-based network. And the horizon is fraught with creative and distracting solutions. Leashing some of that Western Frontier spirit, U S West is blazing its own trail across the canyon that divides today's network from tomorrow's vision. Cover art by Laura M. Doyle

DEPARTMENTS

46 ADVERTISERS' INDEX
6 IN MY OPINION
47 MOVING AROUND INDUSTRY
32 NEW PRODUCTS AND SERVICES

NEWS OF THE WEEK

10 **GREENE REJECTS BELL INFO PLANS**
The judge issues a harsh statement, saying the RHCs would destroy independent information service providers

11 **RHCs UNITE ON MFJ LEGISLATION**
The companies have submitted a joint statement in support of a bill to lift MFJ restrictions, although some changes are sought

11 **HACKER REPROGRAMS SOUTHERN BELL SWITCH**
Florida customers calling a probation office are switched to New York dial-a-porn line; an investigation is launched

12 **MARANO ATTACKS MFJ RESTRICTIONS**
The Bellcore chief says limits on RHCs hurt U.S. research efforts and help foreign competition

FEATURES

17 **IS SONET FINALLY SLOWING DOWN?**
By Michael Warr. Standards proceedings for the synchronous optical network have moved at breakneck speeds. But some experts think the Sonet proceedings may now be losing steam

22 **WHAT WILL TOMORROW BRING?**
By James K. Conlisk. It's hard to imagine a graceful evolution to ISDN from today's chaotically diverse network. But U S West is blazing a trail toward that horizon

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The new VoiceFrame system serves as a communications controller that supports a variety of applications, including intelligent call routing based on database information. It is aimed not at telecommunications managers, but at the management information system side of the house, as a voice access link to existing computer databases.

The system, which will be tested in July and should be available in September, is geared primarily toward insurance companies, financial institutions and franchised industries, said Dan Nix, director of business development for Harris.

"It is designed for any customer that has a need for national sales support and has a large customer base," he said. "Fortune 1000 customers want a solution. They want to buy a solution."

And Harris believes VoiceFrame, based on the Harris 20-20 tandem switch, is that solution.

With VoiceFrame, incoming calls enter the system and are then interpreted and sent via VoiceLink—a "computer-to-switch umbilical cord"—to a host computer. A customer can expect to spend from $50,000 to $200,000 for a system with 300 to 400 ports, Nix said.

The system is not designed to be an addition to a private branch exchange, said Ron Derechailo, director of marketing for Harris, but to function as a separate operation.

Call routing is a typical application of the system, said Derechailo. For example, if a customer calls a business in search of an agent or retail outlet close to the office or to home, automatic number identification provided by the telecommunications network would identify the incoming call's location. When that information is fed into a computer database listing agents or outlets, the system can quickly determine where the nearest provider is and automatically forward the call to that office to be answered, he explained.

"This is a real opportunity for customers to differentiate their product services and develop a competitive advantage," Derechailo said.

Although ANI is currently available in only a limited number of cities via the long-distance network and in fewer locations on the local exchange network, Harris expects the market to grow rapidly, said Nix.

Harris plans to sell its system to MIS

(continued on page 14)

NARUC rate report released

The National Association of Regulatory Utility Commissioners has released a report on basic exchange rates charged by the Bell operating companies in 48 states. Below is a sampling of the rates reported in the study. Listed by state, the rates are based on those in effect on December 31, 1988, for flat rate service within various rate groups used by one-party business and residential customers. There are many variations in the definition of services and NARUC cautions that direct comparisons should not be made.

State	Business	Residential
Alabama	36.73 to 55.08	14.86 to 19.61
Arizona	18.65 to 27.95	8.66 to 11.50
Arkansas	23.21 to 32.01 (urban)	11.11 to 15.31 (urban)
California	Flat rate service generally not available.	8.35
Colorado	19.20 to 30.78	7.82 to 10.74
Connecticut	27.08 to 34.85	9.81 to 12.40
Delaware	22.30 to 25.36	8.10 to 8.65
District of Columbia	11.48	14.94
Florida	19.80 to 29.10	7.30 to 10.65
Georgia	19.00 to 41.30	9.55 to 15.90
Idaho	26.08 to 31.16	15.78 to 17.26
Illinois	5.16 to 12.53 (message rate service in Chicago area only)	2.58 to 8.00
Indiana	31.93 to 47.40	9.85 to 13.17
Iowa	25.70 to 45.25	10.90 to 18.20
Kansas	13.80 to 32.35 (urban)	8.95 to 17.00 (urban)
Kentucky	28.10 to 47.76	11.17 to 16.55
Louisiana	28.68 to 41.90	10.97 to 15.05
Maine	30.20 to 31.86	10.51 to 12.46
Maryland	10.88 to 13.28	5.58 to 7.43
Massachusetts	17.80 to 31.28	6.94 to 11.40
Michigan	19.56 to 26.31	9.02 to 12.08
Minnesota	32.53 to 69.90	13.01 to 23.30
Mississippi	34.61 to 48.65	14.79 to 19.01
Missouri	17.10 to 53.95 (urban)	7.80 to 23.55 (urban)
Montana	35.52 to 38.38	13.73
Nebraska	36.40 to 37.55	14.10
Nevada	33.60	11.25
New Hampshire	24.09 to 45.08	9.77 to 15.51
New Jersey	14.70 to 16.30	6.75 to 8.19
New Mexico	33.65 to 51.47	12.00 to 17.47
New York	22.46 to 39.84 (where flat rate is available)	9.27 to 18.73
North Carolina	27.36 to 34.44	9.94 to 12.51
North Dakota	26.19 to 31.29	10.69 to 12.84
Ohio	17.61 to 46.50	9.11 to 16.23
Oklahoma	20.68 to 41.78 (urban)	9.47 to 13.59 (urban)
Oregon	38.50 to 49.40 (urban)	14.05 (urban)
Pennsylvania	10.00 to 22.00 (local area)	3.60 to 8.40 (local area)
Rhode Island	33.10 to 46.43	11.85 to 16.64
South Carolina	34.05 to 44.25	14.20 to 16.90
South Dakota	23.60 to 34.75	11.00 to 14.20
Tennessee	27.05 to 41.30	7.55 to 14.05
Texas	19.15 to 28.25 (urban)	8.15 to 11.05 (urban)
Utah	28.10	11.84
Vermont	27.38 to 50.98	11.59 to 18.39
Virginia	11.00 to 13.00	5.00
Washington	19.40 to 42.25	8.75 to 18.75
West Virginia	43.56 to 58.23	19.10 to 23.39
Wisconsin	16.50 (message rate service)	14.60 to 17.35
Wyoming	14.81 to 24.34	8.02 to 10.96

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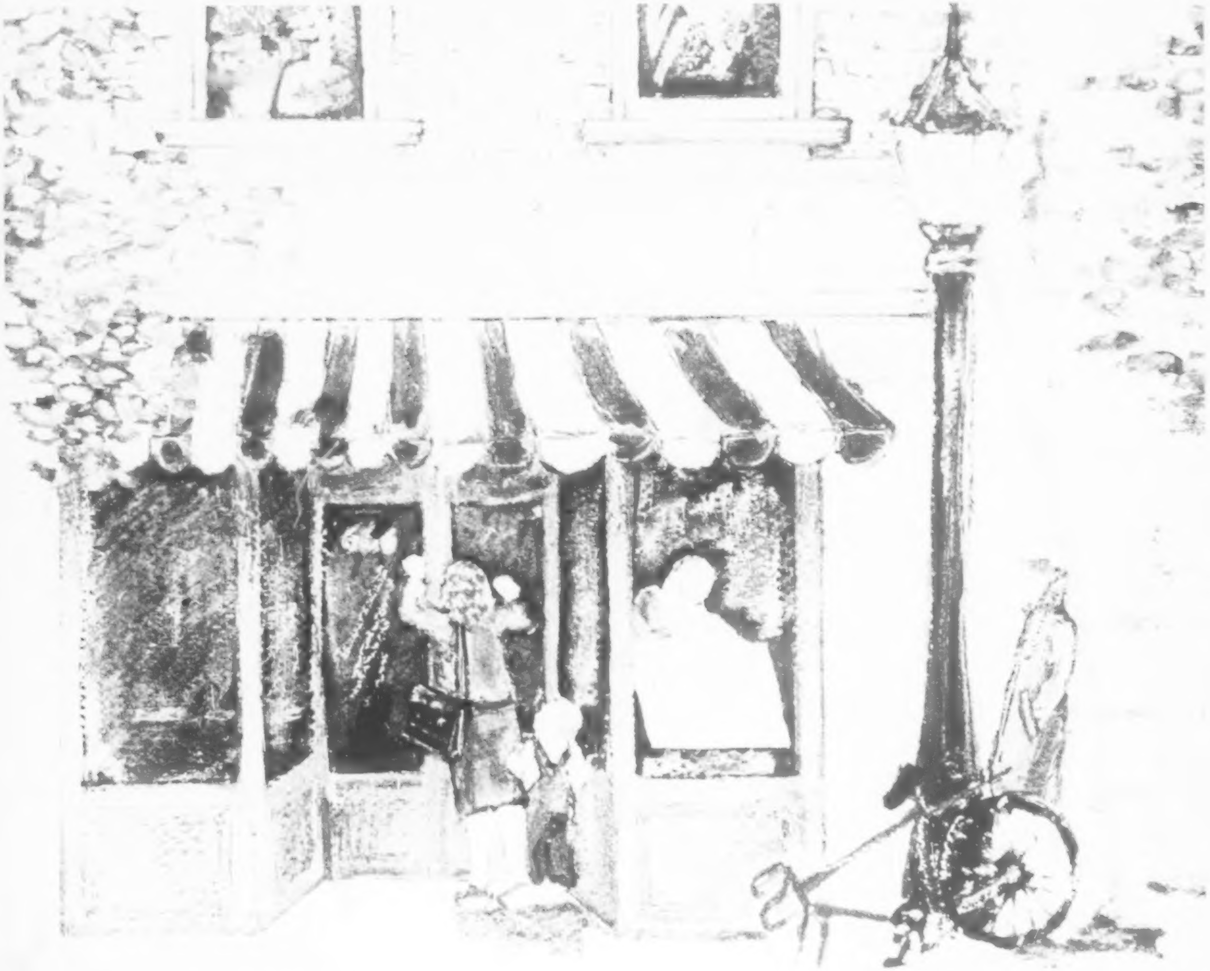

ARE YOU TRULY MARKET DRIVEN? Or will your customers find shuttered offices when they need after-hours service?

U.S., JAPAN SETTLE TRADE DISPUTE

Japan opens markets for cellular products

BELL ATLANTIC WINS AUDIOTEX BATTLE

RHCs can deny billing services to IXCs who don't block calls

MONDAY, JULY 3, 1989 Volume 217, No. 1

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

The mom-and-pop LEC shops have built a reputation on customer service. But are they still accommodating their customers' changing lifestyles, or are they closing shop before the commuter crowd even gets home?
Cover art by Laura M. Doyle

DEPARTMENTS

55 ADVERTISERS' INDEX
6 IN MY OPINION
21 MEETINGS
56 MOVING AROUND INDUSTRY
43 NEW PRODUCTS AND SERVICES

NEWS OF THE WEEK

8 **U.S., JAPAN SETTLE TRADE DISPUTE**
Japan avoids retaliation by agreeing to ease market restrictions on cellular telephone and business radio products

8 **LAWSUIT AGAINST U S WEST UPHELD**
Supreme Court rules Northwestern Bell must face lawsuit filed under the Racketeer Influenced and Corrupt Organizations Act alleging bribery of Minnesota regulators

9 **SIKES FINALLY NOMINATED FCC CHAIRMAN**
After weeks of delay, the White House nominates Alfred Sikes, outgoing head of the NTIA, to be the new FCC chairman

9 **BELL ATLANTIC WINS AUDIOTEX BILLING BATTLE**
Judge Greene rules the RHC can refuse to provide billing services to interexchange carriers who don't comply with rules for blocking calls to audiotex services

FEATURES

22 **AN ALARMING SOLUTION**
By Bob Fuhrman. How do you properly monitor a small, unattended digital CO? A Michigan Bell engineer has devised his own solution

24 **ARE YOU TRULY MARKET-DRIVEN?**
By D. Michael Maxwell and Joseph Steele. Your customers' lifestyles are changing, but are your telco's business practices keeping up with your customers?

32 **WHICH WAY DO WE GO?**
By Paul Travis. It's not quite as hard as turning water to wine. But the BOCs must squeeze capabilities out of their installed base of analog switches, and there's no one clear-cut solution

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566
Closed
Come Again

Are you *truly* market-driven?

Your customers' lifestyles are changing, but are telephone company business practices keeping pace?

D. MICHAEL MAXWELL

JOSEPH STEELE

What is the industry's most important asset and how well is it managed? Suppose for a moment you are the chief operating officer of a telephone operating company.

With that in mind, look over the following list of assets you manage:

Central Offices	100
Buildings	125
Employees	1500
Vehicles	700
Access Lines	250,000
Network Transport (cable and electronics)	1000s of miles

Which of the above assets is most important to your success? Look back over the list and pick one before you read on.

We have asked this question of literally hundreds of people in our Centrex sales and marketing classes nationwide and have found that from presidents to service representatives the answer is almost unanimous—employees.

Employees are important—this is universally accepted. But to say that employees are your most important asset may indicate an inward focus and that is dead wrong.

Access lines are your most important asset. That is where it all starts. Without access lines you do not need the other assets listed. Access lines are customers.

What's In a Name?

Perhaps the reason more people do not get the right answer to the quiz above is because the industry has given customers new names like access lines or end users. Rather impersonal, isn't it? Why not say customer access lines or just plain customers? But the issue runs much deeper than what you call people who buy your services. It is rooted in whether you are market-driven or a market driver.

Many telephone executives state emphatically that they have a market-driven company. Market-driven means one thing—customer-driven. It means listening to your customers and noting changes in their habits and lifestyles. Based on these observations, you change your methods and practices to meet their needs, not your needs. The competitor who listens best, changes quickest to address customer input, and is a pleasure to deal with, wins. You may well say you don't have any competitors, but the local fiber and cable television carriers would heartily disagree.

In previous decades, people were generally at home during the day. If access was needed for an installation or if there was a question on the bill, a call to the office to check out the bill or make arrangements for a new extension was not an inconvenience during normal 8 a.m. to 5 p.m. working hours. In the '60s and even in the '70s, it wasn't a major problem.

Throughout the '80s, the industry has been in great internal turmoil and, therefore, internally focused, while the world around it has changed. Telcos are no longer directly responsible for the customer's inside wire and phones. Telcos take service to the house; customers take it from there. But many customers still want the telephone company to manage the entire job.

Problems arise, however, because customers often are not home during the day anymore. In fact, the daytime empty home is a growing phenomenon. The term "latchkey children" has been coined to talk about the empty homes to which nearly 7 million children return each day. We reviewed the Social Sciences Index back through 1965. The term "latchkey children" didn't show up in the publication until 1985. A statement from a 1987 article in American Demographic magazine says, "from 1980-1985, for example, the proportion of working women with children under age one increased from 39% to 49%. In 1984, 61% of all mothers of children under 18 worked, most full time."

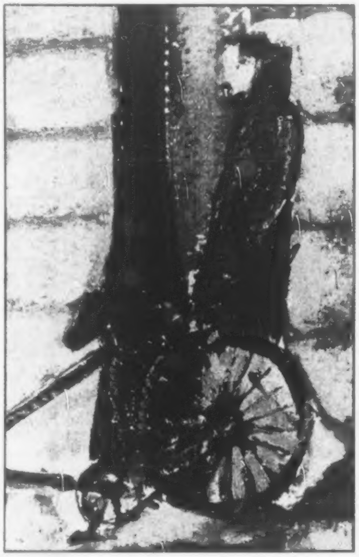
Have telcos changed? The empty home situation exists, and the appointment system has addressed it for years. But if it were not for central office reconnects, deregulation and the requirement that customers handle their own wiring, telcos would be in a mess.

Still, there are millions of people who don't want the hassle of maintaining their own systems. They want telcos to handle the whole job: installation, wiring, maintenance—the works. Observe the inside wire maintenance sales efforts so popular since deregulation. They are a runaway success.

Customers want hassle-free service that works. So, if millions of your customers' homes are now empty during the day, you know their lifestyles have changed. The question really is whether the local telcos' methods and practices have changed to reflect the changes in their customers' lifestyles and expectations. This is market-driven thinking.

Track Record

Local exchange carriers have long measured their service success by what percent of service order due dates were met. This has been a central focus as to how well the company was performing for its customers. Many companies strive to make sure orders are filled within three days, 90% of the time.



But today you should ask, "At what cost?" How many of your customers have had to take time off work and sit around the house for several hours to meet the operating measurement needs of their telephone company? Maybe your service personnel wonder why those customers are so irate when telco representatives don't get there on time. Why don't they understand that your people had problems and just couldn't make it?

The question LECs must ask today is: Who pays those customers while they wait for a telco representative to arrive? The answer is disgruntled employers who are also your customers. You all personally know customers and employers who have complained about this practice.

Are members of single-parent households or two working-adult households supposed to check out billing problems on their employer's time? This seems like a double standard. This industry sells call accounting systems or services to businesses, and one benefit touted is that these systems let employers

continued on page 26

Services marketing

Services marketing involves a unique set of marketing challenges that must be understood and resolved if a new service offering is to be launched successfully or an existing offering is to be retained by its buyers. Everything in services marketing is viewed with a focus on the *customer*.

The customer is paying for something intangible. The customer buys what the service will do, not what it is. To be successful, the service company must periodically remind its customers what the service will do for them. The service company must continuously add value to the basic service capabilities it offers.

The customer never owns anything. There is no touch, feel or "designer look" to the purchase. Satisfaction must come from the solution to problems the service provides for the buyer, not the ownership or control of it, nor the pride of showing it off to others.

The customer never stops paying; the benefits of the service must be resold over and over and over again.

Otherwise, the customer will stop paying. A product purchase, by comparison, usually requires a one-time payment. With a service purchase, the customer buys into a relationship; the length of the relationship will depend on how successful the service company is in continuing to meet the needs of the customer and how well the customer is served every time the service company is contacted—for any reason. The company is only as good, in its customers' eyes, as the last contact with it.

Maintaining a solid relationship requires a strong retention marketing program.

Successful advertising and promotional programs personalize the service and company to the customer. They position the service and company as a partner with the customer for the long haul. They make the service's applications and benefits to the customer precise, understandable and non-threatening. And they have an effect on the company's own customer-contact employees, reinforcing their pride in the service and their desire to help the customer.

Successful administrative programs work best if customer-contact employees are managed by the marketing organization. Close attention must be paid to the motivation and commitment of customer-contact employees. The quality of service provided to customers by administrative, operations and sales employees must be tracked via report analysis and direct observation.

Market-driven *continued*

track employees' non-productive time. And yet, if your customers want to talk to you, they have no choice but to call you during your office hours on someone else's nickel.

Telcos don't hesitate to have a telemarketing center call customers between 6 p.m. and 9 p.m. weekdays and 9 a.m. to 2 pm. on Saturdays to sell new network services.

They know that is when the customer is home. So, why haven't they changed their operations to respond to customers' changing delivery needs during those same hours?

What can you do? Some companies are attempting to react to their customers' changed lifestyles. Most are not. Other service-marketing industries are changing their methods to become more responsive to their customers' changing lifestyles and expectations. Take the banking industry, for example. Vast change is taking place. Banks now offer later hours, Saturday and Sunday hours and responsive services.

Perhaps the local exchange industry should establish extended business office hours, provide flexible installation scheduling, and actively promote these changes in response to its customers' changing needs.

Call your business office and ask the following three questions your customers might ask: What are your business office hours if I have a question on my bill or if I want to order a new service or change a

continued on page 30

TABLE 1 SURVEY RESULTS

Question:
What are your business office hours if I have a question on my bill or if I want to order a new service or change a jack location?

Residential and business* customers

Business office hours	No. of companies	%
7:30 a.m.-7 p.m. Monday-Thursday 7:30 a.m.-5 p.m. Friday 8:30 a.m.-12 p.m. Saturday	1	5
8 a.m.-5 p.m. Monday-Friday	4	20
8 a.m.-5:30 p.m. Monday-Friday 8 a.m.-4 p.m. Saturday	1	5
8 a.m.-6 p.m. Monday-Friday	1	5
8:30 a.m.-4:30 p.m. Monday-Friday	2	10
8:30 a.m.-5 p.m. Monday-Friday	7	35
8:30 a.m.-6 p.m. Monday-Friday	1	5
9 a.m.-5 p.m. Monday-Friday	2	10
9 a.m.-6 p.m. Monday-Friday	1	5

*Business was the same except in every case, the day stopped at 5:00 p.m. One company offered extended hours through the company store.

TABLE 2 SURVEY RESULTS

Question:
If I use you to install my jacks and wire, what time of day can I get that done?

Residential and business customers

Installation hours	No. of companies	%
8 a.m.-5 p.m. Monday-Friday	13	65
8:30 a.m.-5 p.m. Monday-Friday	3	15
8 a.m.-12 p.m. and 1 p.m.-5 p.m. Monday-Friday	1	5
8:30 a.m.-4 p.m. Monday-Friday	1	5
8 a.m.-5 p.m. Monday-Friday and some limited 8 a.m.-12 p.m. Saturday	1	5
8 a.m.-3:30 p.m.	1	5

One company said the customer can be called ½ hr. before appointment.

One company said the customer can find out time of appointment on the day of service.

jack location? If I use you to install my jacks and wire, what time of day can I get that done?

If I don't want to take time off work or in case of business installation don't want my business disrupted, what kind of arrangements can I make to have you wire my jacks after 6 p.m.?

Next, see if what you find matches your company's slogan. Promotional slogans that tell how concerned you are about customers and how hard you are working to serve them better are empty promises unless you back them up with actions.

We conducted a limited random national sample of 20 telephone company customer service offices to test our observations. These offices included major metropolitan areas, smaller cities and Independent telephone company operating areas. Only 10% of the companies offered Saturday business hours (Table 1). One of those companies also offered extended weekday business office hours – 7:30 a.m. to 7 p.m., Monday through Thursday. Most companies continue to reflect an 8 a.m. to 5 p.m. operating mentality (Table 2). Fortunately, so do the CATV companies, which are future arch competitors. Table 3 is the most telling because it summarizes the stated employee attitudes toward customers.

TABLE 3 SURVEY RESULTS

Question:
If I don't want to take time off work, what kind of arrangements can I make to have you wire my jacks after 6:00 p.m.?

Residential and business customers

Categories	No. of companies	%
No arrangements	8	40
Some arrangements— extra charge	5	25
Limited arrangements— Saturday*	4	20
Evenings—extra charge	2	10
Special exception— very expensive	1	5

*Emergencies take precedence

Service representative comments:

'. . .hire an outside installer for work outside normal hours.'

'. . .you can request morning or afternoon installation times on Saturday.'

'. . .we will sometimes schedule Saturday installations, but we can't guarantee because emergencies take precedence.'

'. . .we would need to get special approval for off-hours installation, and it would take two weeks to arrange plus an extra charge.'

'. . .it will cost at least $150 to schedule outside of normal hours, and it's a special exception.'

'. . .It's a real common problem to get off-hours scheduling. Many people are choosing to do their own work.'

'. . .no way for residential. We offer limited Saturday scheduling for business, but nothing in the evening.'

'. . .need to make arrangements one week in advance and pay an overtime rate.'

'. . .have someone wait at the house for you.'

'. . .there is a possibility of special arrangements for business installation. Need to check with a supervisor, and it would cost around $200-$300 extra.'

Check Your Attitude

Telcos must have an attitude about their service business that reflects the customer as supreme. You might call it "other" focused rather than "self" focused. Telcos must fully understand what services marketing is. Only then can telcos use a planning approach to customer-related operating issues and their promotional support programs that keep the customer planted firmly on center stage.

We view services marketing as a key strategic concept in the post-divestiture industry. We have written a set of services-marketing planning statements to help us focus on these important issues as we think about our clients' programs from their customer's point of view (see sidebar page 26). Dozens of new services are being launched in markets all over the country. To be successful, they must be implemented with a services-marketing approach.

One company, Illinois Bell, is responding to its customers' changing lifestyles and expectations, offering business hours from 7:30 a.m. to 7 p.m., Monday through Thursday. Recognizing that most people are either not at home or are ready to relax on Friday evening, their business office hours on that day are from 7:30 a.m. to 5 p.m.

Saturday is the day many people like to handle details such as bill paying. Acknowledging this fact, Illinois Bell has established Saturday hours from 8:30 a.m. to noon. It has also established overtime rates for after-hour work at a customer's home.

This is a good start. Why not try evening installations? Most companies that charge overtime also make the stipulation that the customers must give the company a week or two notice so the "supervisor" can set it up. Why not freely offer convenience installation service? Offer it up-front to every customer with perhaps a 10% premium charge to cover your labor differentials. The telephone company would keep customers who want hassle-free, single-source service that works rather than force them to do their own wiring.

Your Most Important Question

Do you treat your customers as your most important asset and manage them in a market-driven manner? Other companies with broadband capacity pass more than 65% of your current customers and are licking their chops. Some offer broadband T-1 capacity today.

Only a customer-focused and responsive management team will remain the premier information transport provider to the current LEC customer base. **T**

D. Michael Maxwell and Joseph Steele are managing partners in Wink Communications, Chicago.

Which way do we go?

The industry is divided on which of the many options to pursue to upgrade analog switches

PAUL TRAVIS, Executive News Editor

As we move into the digital age, one of the biggest challenges facing telephone companies, especially Bell operating companies, is how to provide digital capabilities and enhanced services and features off the installed base of analog switches.

It is a particularly serious challenge for the BOCs, who have approximately 50 million lines terminating on more than 1700 analog 1AESS switches. It is less of a problem for Independent telcos because they have moved their networks into the digital age more quickly, having leapfrogged the electronic analog stored program control switch when they changed out their electromechanical switches for digital ones.

In recent years, the demands placed on the BOCs to provide new features and services have grown. The demands have come from users, regulators, interexchange carriers, judges and the telcos' own desire to modernize their networks and develop new revenue sources. The features and services include equal access for IXCs, high-speed data capabilities, signaling system 7, the integrated services digital network, videotex gateways and many others.

But many of these cannot be offered on existing analog switches by themselves, which places the BOCs in a difficult position. They have billions and billions of dollars invested in the dependable and feature-rich 1A electronic analog switches, which work just fine and are not yet fully depreciated. And regulators won't allow wholesale replacement with digital switches, fearing massive rate hikes.

Yet, the drumbeat for digital continues, and it is expected to grow as long as the 1As remain in the network—from five to 20 years. So, to compete, the BOCs must develop a strategy to provide the enhanced functions and capabilities. Fortunately, there are many options. Unfortunately, there isn't a consensus on the best one.

Options, Options, Options

One option for the BOCs is to upgrade by installing relatively inexpensive adjunct equipment offered by several niche vendors such as Integrated Network Corp., Network Access Corp. and SRX, which are eagerly pursuing what they see as a great growth market. How large that market will be still remains unclear.

> *. . . the BOCs must develop a strategy to provide the enhanced functions and capabilities. Fortunately, there are many options. Unfortunately, there isn't a consensus . . . .*

INC offers a product line that can provide switched 19.2 kb/s, 56 kb/s or 64 kb/s transmission on existing analog lines via digital line cards.

"A telephone company can order a line interface shelf at a cost of about $10,000 to $15,000 to equip an office, and the present software on the 1A can be used to create a virtual data switch. Then it is done on a per-line or per-trunk basis," explains Craig Bender, INC vice president of marketing. INC, which recently got $23 million in additional financing, has sold its products to Nynex, Bell Atlantic and U S West. Bender said the product is compatible with ISDN and can be upgraded to clear channel 64 kb/s once those capabilities become available.

NAC has sold more than 2 million lines of its System Contac product, which provides equal access for IXCs on a wide range of BOC central office switches. NAC's newest product, System Contac Base, allows the 1A to offer a wide range of enhanced services, including SS7, CLASS, ISDN, digital Centrex, virtual private networking and CO-local area network connectivity. Its SS7 application recently passed Bellcore Phase 1 conformance testing and will be tested this fall by Pacific Bell in San Diego.

NAC President Raju Patel describes his approach as an "applications platform. The technology is such that there isn't anything current digital switches offer today that we can't develop. In fact, we are making features available faster by augmenting the 1A."

SRX, under a multiyear agreement with Nynex, is developing an adjunct network controller that will provide enhanced digital Centrex services over any switch. Options are expected to include 64-kb/s data transmission, 2B+D capability, automatic moves, increased call coverage and routing, station message detail recording, advanced attendant services and single-button programming.

Other options, depending on what is needed, could include CO-LAN products offered by David Systems, AT&T and others, digital cross-connects offered by scores of suppliers, and software upgrades providing SS7 interfaces and other features.

The most common approach taken by the BOCs when digital capabilities and enhanced services are needed is to cap the growth of the 1A and co-locate a digital switch in the same office, in effect overlaying a digital network on top of the analog. As new customers are added and old customers churn off the analog switch, the co-located digital switch grows into a free-standing digital switch and replaces the 1A.

The major digital switch sup-

continued on page 36

pliers are AT&T and Northern Telecom, who control about 80% of the CO market. NEC America is trying to serve that market with its NEAX 61E, and Ericsson has sold some AXE-10s for that role.

Questions, Questions, Questions

The BOCs appear to be faced with a simple question of whether to replace, co-locate or upgrade. Considering the stretched-out 1A replacement schedule, upgrading would appear to be the most economical. But nothing is simple in telecommunications these days.

"It all depends on customer demand, and we are still in the process of determining where that demand might come from. That is what we need to determine the strategy for the 1A," explains Ed Angle, director of network architecture planning for Pacific Bell. Pacific Bell is promoting a network approach called Netsys, which involves a layered architecture using standard interfaces. While planning to provide digital capabilities where needed, the company will not replace more than a couple of its 1As each year until Netsys nodes are available, probably in the mid- to late 1990s.

"When it comes to providing digital Centrex, the question is whether to replace or upgrade. We have a dialogue within the company regarding this type of thing," says Angle. "On one hand, adding things to the 1A slows down the impetus to move to a new environment. On the other hand, we would like to do it that way because it is economical. In California, because of regulation, it is really critical that whatever we do is based on economics and the commission has to agree.

"I think our choice would be to do nothing with the 1A and move to Netsys as fast as it becomes available. We would prefer not to upgrade an analog switch. The vendors haven't shown anything that provides full digital functionality yet. But we are talking to vendors. We wouldn't want to miss an opportunity."

Pacific Bell has installed several NAC adjuncts to provide equal access and will test NAC's new product. "If those tests turn out to be successful, that could change our thinking," Angle says.

Several BOCs already have moved aggressively to provide digital services, with Southern Bell reporting that 44% of its lines are digital. Sister company South Central Bell is 35% digital. As for the Bell regional holding companies, Nynex is 38% digital, Bell Atlantic 34%, Ameritech 30%, U S West 30%, Pacific Bell 28% and Southwestern Bell 25%.

Southwestern Bell wants to move quickly to modernize its networks and has proposed replacement programs in several of the states it serves. In Missouri, the company plans to spend $180 million to put digital switches in 112 communities by 1990. In Kansas, the company says it will spend $160 million to replace 131 analog switches with digital switches.

SWITCHING TECHNOLOGIES—PERCENTAGE OF TOTAL ACCESS LINES

Year	EM	Analog SPC	Digital SPC	Total SPC	Total
1980	58.88	41.09	0.03	41	100
1981	52.86	46.96	0.17	47	100
1982	48.27	51.39	0.35	52	100
1983	42.74	56.35	0.91	57	100
1984	38.20	58.47	3.34	62	100
1985	30.84	59.54	9.62	69	100
1986	23.36	59.98*	16.67	77	100
1987	16.76	58.12	25.11	83	100
1988	10.39	56.48	33.12	90	100
1989	6.55	53.73	39.73	93	100
1990	4.65	50.57	44.78	95	100
1991	2.10	44.35	53.55	98	100
1992	1.14	36.49	62.37	99	100
1993	0.61	27.57	71.82	99	100
1994		19.07	80.61	100	100
1995		12.19	87.77	100	100
1996		7.35	92.61	100	100
1997		4.26	95.70	100	100
1998		2.41	97.55	100	100
1999		1.35	98.61	100	100
2000		0.74	99.22	100	100

EM—Electromechanical
SPC—Stored program control
* Peak percentage for analog SPC

Source: Technology Futures Inc.

Those modernization programs, however, are tied to an effort to reduce state regulation and win greater flexibility in pricing local services. The Missouri Public Service Commission recently rejected Southwestern Bell's proposal and ordered the company to cut rates by more than $100 million annually. Although the state commission said the telco has enough money to go ahead with the modernization program, company officials said the rate cut seriously jeopardizes the entire program.

That action underscores the role state regulators can play in network modernization. In California, regulators are reviewing Pacific Bell's spending practices to see whether the company properly spent funds to upgrade the network. Regulators have the power to slow modernization programs or even disallow recovery of money already spent.

Nonetheless, Phillip Goelz, manager of architecture planning for Ameritech Services, said his company has usually chosen to replace or co-locate, rather than upgrade with adjuncts.

"We've arrived at the conclusion that it's not worth the dollars for the short-term gain [from upgrading with an adjunct]," he says. "You have to ask yourself just what is the marginal utility that an adjunct will provide. Sure, an adjunct affords you the opportunity to install something that gives you a little bit of digital capability without replacing the 1A. But how many are going to put in something that has a limited life?"

Goelz argues that most of the new services demanded by users are really data services, not digital services. "And there are lots of ways to provide data services, such as regular dial-up, private line access to packet switching,

continued on page 39

Which Way *continued*

data-over-voice technology and CO LANs. Now, if ISDN were something that people were banging on the doors for, it might be different. The truth is we carry a lot of data and do it quite well."

Adding an Adjunct

Analysts generally agree that the BOCs, when faced with a demand for advanced capabilities, will co-locate a digital switch or replace the 1A entirely. However, they also say there is a short-term market for adjunct equipment to upgrade the 1As.

"It's a logical market for the Bell companies to look at, especially as a low-cost way to provide some kind of digital capability for an analog CO. There is a potential market out there for upgrades. Companies like INC and others don't have to sell millions and millions of lines to do well," says William Rich, an analyst with Northern Business Information/Datapro.

Rich thinks the 1A replacement market won't take off until 1995-96 as the BOCs wait to see what the next generation switch looks like and wait for the demand for ISDN to develop. "If a telco needs digital off of a 1A, it has the ability to do that. I'm not sure there is any incentive to yank those out. The telephone companies we talk to tend to cap the existing analog switch and co-locate a digital switch, or they use a remote working off a host."

Although products to upgrade the 1A "have a limited lifecycle, these companies are filling a niche in the market today. They will do well in the short term, the next five to seven years," says Rich. "But the telephone companies are not sure of the best way to solve some of these problems, whether to use line cards or adjuncts."

Lawrence K. Vanston, a senior associate at Technology Futures Inc., recently produced a forecast for the major telcos that said analog switches will account for less than 20% of access lines by 1994 and less than 1% by the year 2000 (see chart on page 36).

"What a lot of these add-on products do is buy some time," Vanston says. "It allows you to postpone a major capital invest-

continued on page 41

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Which Way *continued*

ment. But I think there will be a real market for only about five years. I wouldn't want to build a company on that."

Co-location is the strategy Vanston sees the telcos using, and he believes they will quickly shift lines to the digital switch as the "cost of maintaining two technologies gets expensive. The cost of maintenance and buying new software generics will tip the scale."

Jerry Stern, vice president at the Eastern Management Group, also sees the BOCs using co-location and says it has one key advantage: "As long as there is one subscriber on the old switch, it remains in service and can be depreciated in the normal way. That allows telephone companies to provide digital services without directly replacing the 1A and allows them to avoid a big rate hit."

In contrast to many other analysts, Stern believes 1As will remain in service "10 to 20 years into the next century. There is not any chance in the world they will be all gone by the year 2000. I'm not sure there is any compelling reason to replace them. I think the capping and parallel migration strategy will be adequate."

Stern notes that none of the domestic adjunct companies is attempting to become a CO switch vendor. "That market is dominated by AT&T and Northern Telecom. They think that with Open Network Architecture, SS7 and ISDN they can add services on an adjunct basis more quickly than the big switch vendors. They may be right. It provides a degree of freedom in an area where the Bell companies need freedom and it also takes pressure off the big switch vendors.

"The market is screaming for new features on the big switches, but it takes a long time to develop a new software generic. If you can just have a box that sits out beside the switch and offers new services, it makes a whole lot of sense."

Another point the analysts agree on is that the future direction of the network is still cloudy and uncertain.

"Nobody really knows how it's going to wind up. And you have telephone companies spending billions without knowing," says Stern.

"The market is still in its formative states," says NBI's Rich. "The telephone companies are not as eager as they were at first to do major replacements. They have taken a step back and are waiting to see what the future brings."

TFI's Vanston agrees: "Telephone company decision-makers are coming out on both sides of this issue. They are really scratching their heads on this one. And its hard to predict a market that is influenced so much by a small number of decision-makers." ■

Further reading

Pac Bell's Bandler Explains Netsys
Interview with Michael Bandler
Jan. 30, 1989, page 32
CO Vendors in Pursuit of Intelligence
by Michael Warr
April 17, 1989, page 34
The Old 1A— It's Not Dead Yet!
by William Church
May 22, 1989, page 72

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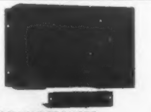

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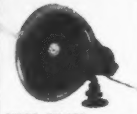

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Telephony

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ON THE HORIZON

The emerging DCS will deliver new revenue-generating services

UNIONS STRIKE THREE RHCs

More walkouts expected as contracts expire

SW BELL DELAYS CO SWITCH PURCHASE

Regulatory reversal puts network modernization on hold

MONDAY, AUGUST 14, 1989 Volume 217, No. 8

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

With digital cross-connect systems, transmission signaling isn't just going in one ear and out the other. In fact, new systems on the horizon could be gateways to Sonet.
Cover photography by Steve Donisch

DEPARTMENTS

82 ADVERTISERS' INDEX
6 IN MY OPINION
32 LETTERS
33 MEETINGS
65 MERITS AND MILESTONES
84 MOVING AROUND INDUSTRY
66 NEW PRODUCTS AND SERVICES

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NEWS OF THE WEEK

8 **STRIKES HIT THREE RHCs**
Health care issues trip up efforts to reach new contracts at Pacific Telesis, Nynex and Bell Atlantic. More strikes are expected as three additional contracts expire

9 **BELLSOUTH REACHES CWA AGREEMENT**
Salary and health care issues are tentatively resolved in time to avert a strike

9 **SW BELL DELAYS BIG CO SWITCH PROCUREMENT**
Its major network modernization plan is placed on hold in the wake of an unfavorable regulatory decision

10 **AT&T FILES COMPLAINT AGAINST MCI**
The giant long-distance carrier seeks damages because its arch-rival failed to file tariffs

FEATURES

34 **DECISIONS FOR FUTURE GROWTH**
By Steven Neveroski. DSX choices will help determine density, capacity and capability of future networks

40 **SIGNAL PURITY IN HIGH-CAPACITY EDSXs**
By Gary Davison. New network elements are popping up every day, and electronic digital cross-connects attract network providers with their integrated solutions. Unfortunately, these solutions also bring the risk of signal distortion

48 **TEACHING OLD CROSS-CONNECTS NEW TRICKS**
By Robert Conroy. Once the mainstay of CO grooming applications, the DCS is emerging as a vehicle for delivering new revenue-generating services

61 **SONET: PROBLEM OR OPPORTUNITY?**
By Gilbert L. Pringle. Digital cross-connect systems can be gateways to the evolving synchronous network if vendors, planners and committees attend to the technical side of things

In My Opinion

The new majority

The King is dead. Long live the King!

A new era is about to unfold at the Federal Communications Commission and it is beginning on a promising note.

Alfred Sikes, Sherrie Marshall and Andrew Barrett are the new Bush majority on the FCC. The wealth of experience and knowledge they bring to the job bodes well for the future. After all, these are the folks who are going to be watching over—and perhaps deciding the fate of—the various communications industries as we enter the 1990s.

These are not people who will need a long time to get up to speed. All three are familiar with the important issues and changes confronting our industry; they've been dealing with them in one fashion or another in their previous positions.

The contrast with previous FCC appointments is striking, especially when you look at the chairmanship. President Reagan appointed Mark Fowler and then Dennis Patrick. Fowler, an obscure broadcast attorney, became best known for his passion for deregulation and his battles with Congress. Patrick, who came out of the White House personnel office to join the FCC, carried on in the same tradition. Yet, despite their inexperience and hard-line ideology, they accomplished much as broadcasting, cable television, telecommunications and other industries underwent radical transformations in the 1980s.

As the new chairman, Sikes brings a big-picture viewpoint to a job that involves a lot of nuts-and-bolts and hair-splitting decisions. As head of the Commerce Department's National Telecommunications and Information Administration, he spent time worrying about the "telecommunications infrastructure" and "national competitiveness," and he laid out a blueprint for the future in NTIA's Telecom 2000 report. That background should provide a solid basis for dealing with the more mundane aspects of implementing policy and ruling on tariffs. In addition, his time in the administration should have taught Sikes the value of compromise and good congressional relations.

Sikes' two partners on the commission also bring valuable experience. Marshall, a Washington attorney who once worked for Patrick as congressional liaison, knows the hot issues and how *not* to deal with Congress. Barrett, a member of the Illinois Commerce Commission, brings a state perspective to an agency all too often accused of ignoring state concerns.

The challenges facing the new majority are many. They should not lose sight of the bigger issues as they consider topics such as access charges, open network architecture, price caps, Tariff 12 and telco-CATV cross-ownership.

Sikes, Marshall and Barrett have the power to speed the deployment of new services and technology to homes all across America. By forging a better relationship with Congress and earning the respect of Judge Greene, the new commission may be able to regain control of communications policy and again set the national agenda. And they can provide the leadership to ensure that the United States remains in the forefront of the information revolution.

The tasks are tough and the decisions will be difficult, but Sikes, Marshall and Barrett bring the right kind of expertise and perspective to the job. The new FCC is getting off to a good start.

Paul Travis

Telephony

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INTERTEC

NEWS OF THE WEEK

Unions strike three regionals; more employee walkouts expected

Dawn Bushaus, Assistant Editor

Union workers at Bell Atlantic, Nynex and Pacific Telesis went on strike last week, citing "inadequate" health care proposals as the major stumbling block to reaching new contracts. More strikes were expected as workers at Ameritech, Southwestern Bell and U S West prepared to walk out when their contracts expired Aug. 12.

BellSouth was the only RHC to reach a tentative agreement with its union employees (see story, page 9).

Both sides said last week they will not back down on the health care issue. The striking workers, represented by the Communications Workers of America and the International Brotherhood of Electrical Workers, do not want to see the costs of health care premiums passed on to them through "share plans."

Analysts agree that the longer the strikes continue, the greater the chances that customers will feel the effects.

"It's true that the longer the strikes go on, the more pressure there will be on the quality of service and the ability of the telco to respond to customers needs," said Richard Toole, analyst with Merrill Lynch.

Management employees, who are filling in for striking workers, may not have the technical expertise to install equipment or perform repairs, thus causing long delays in service.

Some industry experts said they believe the telcos could come out ahead financially in the wake of strikes because they are saving the salaries of the union employees.

Marianne Bye, analyst with Shearson Lehman, said strikes do not normally have a significant impact on earnings, but added that the longer the strike goes on, the higher the companies' third quarter earnings will be.

"A strike is only inconvenient to the customer," she said.

But Frank Governali, analyst with First Boston, disagreed.

"I can't envision a scenario where a telco could come out ahead," Governali said, adding he does not believe the money saved in union salaries would outweigh the expenses a telco incurs during a strike.

In an unusual move, Pacific Telesis, Nynex and Bell Atlantic issued statements last week detailing their contract proposals. Nynex appeared to be furthest from an agreement with its union employees as the two sides did not even negotiate up to the Aug. 5 deadline.

PacTel said it offered workers a three-year contract with an average 10.9% wage increase. Nynex said it offered workers an immediate 5% wage increase, including a payout of up to $[illegible]000, and 2% increases in the second and third years of the contract, plus cost-of-living adjustments. Without being specific, Bell Atlantic said it offered base wage increases in each year of the three-year proposal, plus a $300 bonus when the contract is signed.

Ken Pitt, a spokesman for Bell Atlantic, said the company felt it had offered a fair proposal.

"We thought we had a deal," he said. "We were very surprised when they walked away."

But a CWA spokesman for Bell Atlantic workers, Bill Bickers, said the union is still concerned with health care offers.

Bell Atlantic wanted to extend the medical deductible required on care besides surgery, hospital medication, physician visits and hospitalization to include hospitalization, Pitt said. The company also wanted to implement a preferred provider plan.

At Pacific Telesis, the issue of pay equity for women broke down talks. The wage proposal would have widened the gap between men's and women's salaries, according to the CWA.

In addition, the CWA denied that PacTel had offered a 10.9% wage hike and said a 5% increase was the only formal proposal on the table. "Anything that alludes to the more 'generous' figure of 10.9% being published by the company is an unofficial, if not completely fictitious, announcement."

No one was predicting a quick end to the strikes. In most cases, negotiations had not resumed. Bell Atlantic and the CWA were the only parties to resume negotiations by mid-week. **T**

CONTRACT SCOREBOARD

Company	Number of employees CWA	IBEW	Status
BELL ATLANTIC	41,000	11,000	on strike
BELLSOUTH	64,000		settled
PACIFIC TELESIS	42,400		on strike
Pac Bell Directories		1600	expired Aug. 12
NYNEX	40,000	20,000	on strike
AMERITECH	35,000	13,600	
Illinois Bell	3000		expired Aug. 12
		13,000	settled
Indiana Bell	4300	400	expired Aug. 12
Wisconsin Bell	4000		expired Aug. 12
Ohio Bell	10,200		expired Aug. 12
Michigan Bell	13,000		expired Aug. 12
Ameritech Services	600	200	expired Aug. 12
U S WEST	41,000		expired Aug. 12
SOUTHWESTERN BELL	45,000		expired Aug. 12

Telephony

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FO NETWORK SURVIVAL GAME PLAN

Telcos must have a strong defense to protect their networks from cable cuts and node failures

PICKETS POP UP AT AMERITECH

Strikes continue at PacTel and Nynex; SW Bell and U S West reach settlements

PACTEL INT'L SEEKS PCN LICENSE

RHC joins forces with Millicom, Matra and British Aerospace

MONDAY, AUGUST 21, 1989 Volume 217, No. 9

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

Hey, listen up! We aren't going to have any fans if you guys can't defend our fiber optic network against node failures and cable cuts. If we're gonna survive out there, you've gotta follow a new protective game plan. Cover art by Alan Brunettin

DEPARTMENTS

50 ADVERTISERS' INDEX
6 IN MY OPINION
20 MEETINGS
52 MOVING AROUND INDUSTRY
37 NEW PRODUCTS AND SERVICES
34 THE WAY WE WERE

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NEWS OF THE WEEK

8 **UNIONS STRIKE AMERITECH; TWO RHCs SETTLE**
Southwestern Bell and U S West reach tentative settlements; strikes spread to Ameritech companies while continuing at PacTel and Nynex

9 **PACTEL INTERNATIONAL SEEKS PCN LICENSE**
The RHC joins forces with British Aerospace, Millicom and Matra to win a license to operate a personal communications network in the United Kingdom

12 **US SPRINT COMPLETES PTAT ACQUISITION**
The interexchange carrier expects the trans-Atlantic fiber optic cable will boost its international market share

13 **ONA TAKES ANOTHER HIT FROM CRITICS**
Opponents of the FCC's Open Network Architecture plan criticize the agency's "hands-off" attitude

FEATURES

22 **CRASH-PROOF FIBER RINGS**
By Tom Helmes. Ring networks, not diamond rings, are a telecommunications carrier's best friend, when it comes to insuring against an unexpected turn of events

24 **NETWORK SURVIVAL GAME PLAN**
By Wayne Ergle. In today's high-capacity fiber optic networks, you can't deflect node failures and cable cuts with a mere electronic failure protection play. But three system architectures used with asynchronous products can cost-effectively make the save

32 **L.A. COUNTY GETS THE MESSAGE**
By Ward A. Flora. Sometimes you just can't say no. This county government couldn't when it was offered a voice mail system that saved money by making its managers more efficient

In My Opinion

Summertime blues

This has been a summer of discontent for those who favor regulatory reform within the local exchange network. Three separate events have converged to create a climate far less favorable to reform than that which existed only a few months ago.

First and foremost, of course, is the Department of Justice opinion, issued in July, that the Federal Communications Commission's plan to replace rate-of-return regulation for local exchange carriers with price caps violates federal antitrust law. Although not a definitive death knell for LEC price caps, it does throw at least a few shovels of dirt onto the coffin.

Also damaging is the news that New York Telephone, an incentive rate plan pioneer, may soon go hat in hand to the New York Public Service Commission begging for as much as $900 million in additional rates. Two years ago the company agreed to a rate moratorium, in exchange for the right to keep half of any profits above a set rate-of-return level. The NYPSC had agreed in 1987 to test the incentive waters, believing the widely held industry argument that regulating prices, not profits, would serve the public interest while giving the telco the incentive to operate more efficiently.

Both New York Tel and the NYPSC believed there would be excess revenues for stockholders and ratepayers to share. According to the telco, it hasn't worked out that way. Instead, New York Tel says it needs $350 million in rate adjustments this year, to avoid the $900-million rate increase in 1991, when the rate moratorium expires.

The third event was the Missouri PSC's June decision to reject Southwestern Bell's price cap-type plan and instead order a $101-million rate cut. This decision prompted Southwestern Bell to delay—and possibly shelve—a digital modernization plan that was one of the most aggressive of the Bell regional holding companies. The three-state plan would have involved as many as 600 switches, by industry supplier estimates, at a cost of up to $2 billion.

It is possible that state regulators in Kansas and Texas will accept the plan and that much of the digital switch procurement will proceed. Even so, the Missouri experience is a cautionary tale for the entire industry.

Clearly, there is much yet to be done on this front. At the federal level, LECs have lost their biggest price-cap advocate, former FCC Chairman Dennis Patrick, and may find his replacement, Alfred Sikes, less eager to battle Congress and the DOJ on this issue.

State regulators are the real key, however, and here again the battle remains uphill. Many eyes were trained on the New York experience, and it is likely that problems there will be a hot topic of discussion around many a public utility commission table.

Missouri regulators didn't reject modernization, but they insisted Southwestern Bell pay for the new switches out of its existing revenues, maintaining that the telco would reap the benefits of digital efficiencies. And they rejected in concept a Southwestern Bell plan, similar to the FCC's national plan, that would tie rate increases to the consumer price index, with a 3% productivity figure factored in. Instead, the commission said, rates should remain tied to Southwestern Bell's specific costs of providing service.

The New York and Missouri experiences show that the challenge remains to develop a plan that stimulates modernization of the network while offering protection to both ratepayers and shareholders. Perhaps California, home to other trends and innovations, can offer some hope with its pending incentive regulation study. After all, bad things are supposed to only come in threes.

Carol Wilson

Telephony

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INTERTEC

Union walkout hits Ameritech; two RHCs reach settlement

Dawn Bushaus, Assistant Editor

Southwestern Bell and U S West reached tentative settlements with the Communications Workers of America shortly after their contracts expired last week. But union workers at the Ameritech companies walked out, bringing to four the number of Bell regional holding companies hit by strikes.

The major bargaining stumbling blocks to reaching new contracts at Bell Atlantic, Nynex, Pacific Telesis and the Ameritech companies are wages and health care.

Southwestern Bell and U S West workers settled for provisions similar, but not identical, to those contained in the CWA agreement reached a week earlier with BellSouth *(Telephony, Aug. 14, page 9)*.

Workers at Southwestern Bell will receive a 5.25% wage increase, which includes a $1000 bonus, effective upon ratification of the contract. During the second and third years of the contract, CWA members will receive 2.25% increases and a cost-of-living allowance. Cost-of-living increases in excess of $400 will be added to the base wage.

At U S West, workers will receive a 5% wage increase, which includes a $600 bonus. During the second year of the contract, they will receive a 2.5% increase and a 3% team incentive award. In the third year they will receive a 2.25% increase and a 3% team incentive award.

CWA employees at both telcos are scheduled to vote on ratification of the tentative settlements in mid-September.

At BellSouth workers will get a 4% increase in their base pay the first year. Bonus payments, which do not boost base salaries, are not part of the agreement. Employees can expect to receive increases ranging from 8% to 11% during the three-year contract.

At U S West and Southwestern Bell, CWA workers refused to back down on the issue of health care, and for the most part they were successful.

Health benefits at U S West remained mostly unchanged. According to a CWA spokesman, the RHC combined the best aspects of its three Bell operating company-CWA contracts to form the health care package. U S West bargained only regionally this year.

At Southwestern Bell, workers will not share the costs of health care premiums for dependents as the telco originally proposed, and they have gained 20% more coverage for vision and dental care. But workers there who participate in the already-established preferred provider plan can expect to pay slightly more for physician visits and prescriptions.

Workers who choose their own physicians received some improved benefits, including coverage of psychological and chemical dependency treatment.

BellSouth, Southwestern Bell and U S

CONTRACT SCOREBOARD

Company	Number of employees CWA	IBEW	Status	Settlement terms
BELL ATLANTIC	[illegible]	11,000	on strike	
BELLSOUTH	64,000		settled	8%-11% wage increase
PACIFIC TELESIS	42,400		on strike	
Pac Bell Directories		1600	settled	details not available
NYNEX	40,000	20,000	on strike	
AMERITECH	35,100	13,600		
Illinois Bell	3000		on strike	
		13,000	settled	(IBEW) 9% wage increase includes $1000 bonus
Indiana Bell	4300		on strike	
		400	settled	(IBEW) details not available
Wisconsin Bell	4000		on strike	
Ohio Bell	10,200		on strike	
Michigan Bell	13,000		on strike	
Ameritech Services	600		on strike	
		200	settled	(IBEW) details not available
U S WEST	41,000		settled	10% wage increase includes $600 bonus

CWA workers picket an Illinois Bell facility in Chicago.

West all negotiated new family care packages into their agreements. Workers at the three companies may now take up to one year off with the guarantee of employment upon return to care for newborn or adopted children or for a family member who is ill.

The issue of a lump-sum bonus payment that is not included in the base wage caused CWA workers at the Ameritech companies—Illinois Bell, Wisconsin Bell, Indiana Bell, Ohio Bell, Michigan Bell and Ameritech Services—to walk off their jobs at midnight Aug. 12.

"It distorts the package and does not give employees enough protection," said Greg Kenefick, CWA spokesman for Ameritech workers. "When the [bonus] money is gone, it's gone."

Although the CWA rejected proposals from the Ameritech companies, International Brotherhood of Electrical Workers employees settled with Illinois Bell, Indiana Bell and Ameritech Services.

At Illinois Bell, where the IBEW represents the majority of the union work force, the IBEW voted 3-to-1 last month to ratify a new contract. Most IBEW workers were crossing CWA picket lines and reporting for work, Illinois Bell said.

Illinois Bell, which offered CWA members a contract similar to the IBEW's, was surprised the CWA rejected its proposal.

"We were very surprised and disappointed," said Patricia Montgomery, senior director of media relations for Illinois Bell. "We really felt we were very close to an agreement."

Illinois Bell has offered CWA workers a 5% wage increase for the first year, which includes a $1000 bonus, and additional 2% increases in 1990 and 1991. The proposal also includes cost-of-living adjustments. Other Ameritech BOCs have offered similar proposals, but the CWA has said it will not back down.

Kenefick said the CWA has sent telegrams to the state public utility commissions in the Ameritech region asking that they investigate the possibility of rate rollbacks during the strike because of the money the telcos save by not paying salaries to striking employees.

"There is clearly a decline of service [during a strike]," said Gaye Williams Mack, a CWA spokeswoman in Washington. "Why should customers pay the same amount of money?"

But Ken Hoyt, a telecommunications consultant with Arthur D. Little, said he believes the CWA's efforts to win support from state commissions is a ploy.

"I think that's a grandstand play," he said, adding that, because the nation's telecommunications network is so highly automated, customers will not feel much effect from strikes unless they continue for several months.

"In the short term, a strike is one of the best things that could ever happen to a company," Hoyt said.

Bell company management employees "rise to crises," he said, adding they will keep the companies afloat provided the strikes are short-lived.

It is still unclear, however, whether the strikes will be short term. At press time, Bell Atlantic, Nynex and Pacific Telesis had resumed at least informal bargaining. But no settlements were in sight.

The Ameritech companies had not resumed any talks with the CWA.

PacTel enters battle for PCNs

Paul Travis, Executive News Editor

Pacific Telesis International became the latest U.S.-based company to enter the race for one of the United Kingdom's personal communications network licenses when it announced last week it had joined an international consortium to seek a PCN license.

PacTel International said the group is headed by the Space Systems unit of British Aerospace Ltd., which has a 35% interest. PacTel International will hold a 20% share. Other partners include Millicom U.K. Ltd. with a 14% share, and Matra Communications S.A. of France, which holds a 10% share. The remaining 21% is reserved for future partners.

Two or three PCN licenses are expected to be awarded by the end of the year as part of an effort to promote competition with existing U.K. cellular systems. The new, two-way mobile systems are expected to begin operations in the early 1990s.

One of the PCN licenses has been reserved for a consortium led by Cable & Wireless plc. Motorola has joined the C&W group, and discussions are continuing with other potential partners.

At least two other groups—both with Bell regional holding companies as partners—have announced their intentions to seek a PCN license *(Telephony, July 31, page 17)*. U S West has teamed up with STC Telecommunications, part of the STC Group, to bid for a license. BellSouth has joined forces with GEC and Plessey to submit a bid.

"We believe this exciting new technology could have a major impact on the way people communicate. Just as cellular networks have made it easier for people on the move to keep in touch, PCN will further expand the public's communications options," said C. Lee Cox, group president of the diversified businesses unit of Pacific Telesis.

Cox also noted that the move to seek a

continued on page 12

Telephony

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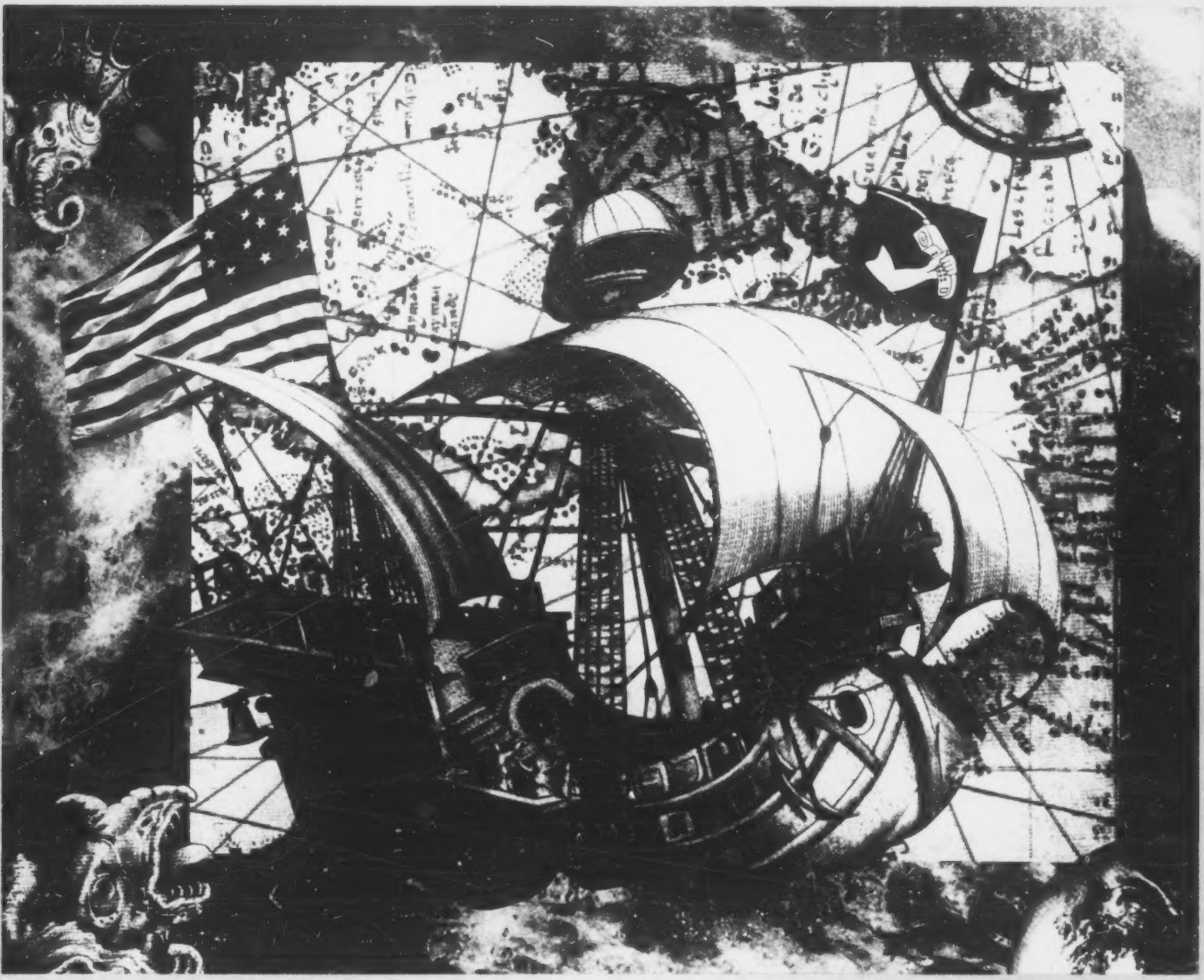


U.S. TELECOM VENDORS GO GLOBAL

Manufacturers set sail into the tricky international market waters in search of new opportunities

COURT SHAKES UP CANADIAN TELECOM

Landmark decision gives federal government authority to regulate telecommunications

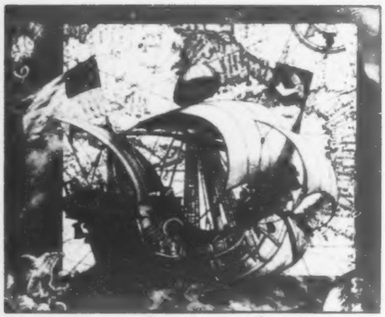
PACIFIC TELESIS REACHES SETTLEMENT WITH UNION

Union strikes continue against Ameritech, Bell Atlantic and Nynex

MONDAY, AUGUST 28, 1989 Volume 217, No. 10

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



It seems manifest destiny has found its way into the hearts of U.S. telecom vendors. No longer satisfied with their domestic market, they're sailing into tricky international market waters. But will they find treasure across the ocean? Cover art by Cathy Joritz

DEPARTMENTS

66 ADVERTISERS' INDEX
6 IN MY OPINION
26 MEETINGS
68 MOVING AROUND INDUSTRY
56 NEW PRODUCTS AND SERVICES

NEWS OF THE WEEK

8 COURT SHAKES UP CANADIAN TELECOM
In a landmark decision, the Supreme Court of Canada says the federal government has authority over provincial governments in regulating telecommunications

9 PACIFIC TELESIS REACHES UNION SETTLEMENT
The Communications Workers of America win a tentative contract from PacTel; strikes continue against Ameritech, Bell Atlantic and Nynex

10 MICHIGAN BELL TESTS AUTOMATED BILLING
The Northern Telecom system uses voice recognition technology to eliminate the need for operator assistance on collect, credit card and third-party billed calls

14 U S WEST RESPONDS TO AIR CRASH
Telco employees worked around the clock to provide emergency communications service following the DC-10 crash in Sioux City, Iowa

FEATURES

28 BIG BUSINESS DRIVES U.K. LOCAL FIBER
By John Williamson. Britons haven't been particularly hot on bringing fiber to the local loop. But fiber could be spurred to the curb by CATV piggybacked with interactive telecom services and flexible access systems

34 GOING GLOBAL
By Fritz W. Ringling. Long satisfied with their domestic market, U.S. telecom vendors now are sailing into tricky international market waters

50 INVESTMENT FRENZY!
By Sunil Tagare. Investment in undersea fiber optic systems is increasing at a tremendous pace. The driving force is enormous profit

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In My Opinion

Man in the hot seat

Pekka Tarjanne is about to move into the hottest seat in the global telecommunications business. The sometime physicist, politician and Finnish PTT chief takes over Nov. 1 for Richard Butler as secretary general of the International Telecommunication Union.

Although there were originally two other candidates for the post, few people would willingly change places with Tarjanne. In addition to holding the ring between the numerous conflicting claims of the developed and developing world nations and fighting off a growing external challenge to the ITU's standards-making responsibility, Tarjanne will be running a United Nations agency that is sorely strapped for cash. This circumstance adversely affects its ability to discharge its obligations to its members and clearly does not help the morale of the ITU staff. In the recent past the staff has disrupted work in disputes over terms of employment and pensions.

And if all these problems were not enough, the very structure of the ITU may be in for a radical overhaul. In response to suggestions that its traditional organization had been rendered obsolete by recent changes in technology and the international regulatory environment, the 124-year-old agency has set up a high-level committee to analyze its modus operandi in detail and suggest appropriate changes. For Tarjanne, this situation is a little like taking a driving lesson in a vehicle still on the production line.

The Finn remains unperturbed by the likely rigors of his new office. And there are good reasons for his attitude.

One reason is that, being from outside the organization, he lacks the inhibitions that affect some of the insiders. What may be daunting or even impossible for someone steeped in ITU lore may be unexceptional to the new kid on the block.

Second, Tarjanne will not be alone. His predecessor Butler could, and sometimes did, play all the instruments in the ITU band himself. By contrast, Tarjanne is a team player with a deep-seated belief in delegation.

"The work of the ITU is not a one-man show," Tarjanne said in his acceptance speech. "It can be described much better and to the point as team work by its 166 members, served by the elected officials and the staff as a whole in Geneva and all over the world."

Of course, not everything will be sweetness and light for Tarjanne. I want to wish him every strength and the best of luck in the struggles ahead.

John Wil

Telephony

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INTERTEC

to attach their own terminal equipment to the telephone network although other provinces do not.

CNCP Telecommunications can provide interconnected private line services in British Columbia, Alberta, Ontario and Quebec, but not in other provinces. National competitors must go through lengthy and expensive hearings in each province in which they wish to operate, Egan said. The Supreme Court decision will eliminate these problems and allow the CRTC to have uniform rules across Canada. T

PacTel, CWA come to terms

Dawn Bushaus
Assistant Editor

Pacific Telesis reached a tentative settlement with the Communications Workers of America early last week, ending a two-week strike. But on the other coast, tension between Nynex and the union increased and the two sides seemed to grow further apart.

The mood of striking CWA members turned increasingly bitter after one union worker was killed while picketing. Edward G. Horgan, 34, a cable splicer with Nynex, died Aug. 16, one day after he fell off the hood of a car that was attempting to cross a picket line on a service road at a Nynex/New York Telephone facility in Valhalla.

Horgan climbed onto a car driven by another Nynex employee, Tricia McNamara, according to Lt. Michael Mahony of the Valhalla Police Department. Horgan then reportedly fell off of the car and struck his head on the pavement.

Police have not made any arrests in connection with the incident and an investigation is continuing, Mahony said.

Several thousand CWA employees rallied at a Nynex facility in White Plains Aug. 17 to commemorate Horgan's death, and many attended his funeral.

CWA spokeswoman Clara Allen said Horgan's death may have contributed to increased tension between Nynex and the CWA. "Anything that harms an individual does intensify the efforts of the people picketing," she said.

Also in the Nynex region, Donna Conroy, head of the CWA local in upstate Troy, N.Y., was arrested while picketing and charged with disorderly conduct Aug. 21.

Allen said "several" CWA members have been arrested and restraining orders have been issued against Nynex picketers since the strike began Aug. 6.

"We consider the incidents to be harassment," she said.

At press time, no formal or informal negotiations were scheduled at Nynex. Talks broke down initially over what the CWA called attempts by the telco to shift the rising cost of health care to workers.

Elsewhere in the country, the Ameritech companies were scheduled to resume talks for the first time since the CWA struck the five telcos Aug. 13.

Negotiations at Illinois Bell, Indiana

continued on page 10

CONTRACT SCOREBOARD

Company	Number of employees		Status	Tentative settlement terms
	CWA	IBEW		
BELL ATLANTIC	41,000	11,000	settled (except some local issues)	7.5% wage increase
Bell of Pennsylvania		2000	settled	7.5% wage increase
New Jersey Bell		9000	on strike	
BELLSOUTH	64,000		settled	8%-11% wage increase
PACIFIC TELESIS	42,400		settled	9.4% wage increase
Pac Bell Directories		1600	settled	details not available
NYNEX	40,000	20,000	on strike	
AMERITECH	35,100	13,600		
Illinois Bell	3000		on strike	(IBEW) 9% wage increase includes $1000 bonus
		13,000	settled	
Indiana Bell	4300		on strike	(IBEW) details not available
		400	settled	
Wisconsin Bell	4000		on strike	
Ohio Bell	10,200		on strike	
Michigan Bell	13,000		on strike	
Ameritech Services	600		on strike	(IBEW) 10% wage increase includes $1000 bonus
		200	settled	
U S WEST	41,000		settled	10% wage increase includes $600 bonus
SOUTHWESTERN BELL	45,000		settled	10% wage increase includes $1000 bonus

Bell, Ohio Bell, Wisconsin Bell, Michigan Bell and Ameritech Services broke down over the issue of wages. Workers do not want bonus payments upon ratification. Instead, they want all increases to be reflected in the base wages.

Indiana Bell, Illinois Bell and Ameritech Services have already settled with the International Brotherhood of Electrical Workers.

Some of the IBEW members were crossing picket lines, but still voicing support for the CWA. Other IBEW members refused to cross picket lines.

The CWA began an advertising campaign last week in the five Ameritech states urging customers not to pay their phone bills until the strike is settled.

The CWA alleges Ameritech has contacted radio stations to request that they not air the advertisements. Scores of radio stations have refused to sell the CWA air time, the union said.

Ameritech spokesman Steve Ford said, however, Ameritech has not contacted any radio stations about the campaign.

"That is absolutely false," Ford said. "It's just another side show of the CWA. The real issue here is the need to focus on the issues at the bargaining table."

At Bell Atlantic, CWA workers had not gone back to work by mid-week even though they reached a tentative regional agreement Aug. 17. The strikes continued in support of IBEW workers at New Jersey Bell, which had not reached an agreement, and because local issues had not been settled at some of the Bell Atlantic companies.

A Bell Atlantic spokesman reported that New Jersey Bell had tentatively settled its local issues, as had the C&P Telephone companies. Bell of Pennsylvania and Diamond State Telephone continued to negotiate locally.

Bell of Pennsylvania reached a tentative settlement with its IBEW members. That agreement calls for a 3% wage increase the first year of the contract and 2.25% increases the following two years. A cost of living allowance will also be added in the second and third years.

The two sides agreed to establish a health care network of hospitals and physicians that agree to hold down the costs of health care.

The CWA agreement with PacTel, still subject to ratification, resembles the tentative settlements of Southwestern Bell, BellSouth, U S West and Bell Atlantic.

Workers at Pacific Bell and Nevada Bell will receive a 3.1% increase in base wages for the first year of the contract, followed by a 3.7% increase in the second year and a 2.6% increase in the third.

Workers will also share in lump-sum team incentive awards that will be based on the financial and service results of the companies.

A preferred provider health care plan will be instituted under which employees who choose a "preferred" physician will pay only $10 for an office visit. Under the plan, some services, such as preventative care, will be completely covered by the company.

The PacTel agreement also provides for family care benefits, including a provision allowing employees to take up to a year off—with employment guaranteed upon return—to care for a newborn, an adopted child or an ill family member. Also included in the pact were reimbursement for expenses associated with adoption and the establishment of a joint union-company committee to study family care needs.

Pacific Bell Directories settled two weeks ago with its IBEW workers, but the Pac Bell subsidiary has not released terms of the tentative agreement. ■

Dennis bids adieu to FCC Oct. 1

Dennis

Commissioner Patricia Diaz Dennis will leave the Federal Communications Commission Oct. 1 to join a law firm, she announced last week.

Dennis' appointment to the commission expired June 30. However, she stayed on at the FCC while the three recently appointed commissioners were confirmed to their new posts. Dennis was appointed to the FCC by President Reagan in 1986. Before taking the seat on the commission, Dennis was a member of the National Labor Relations Board. Prior to entering government service, she worked as a labor attorney with ABC.

Dennis said she will become a partner in the Ohio-based law firm of Jones, Day, Reavis and Pogue. She will work in the firm's Washington office and head up the communications section.

Dennis also had been negotiating over a possible position with MCI, according to MCI executives.

It is up to the White House to name a successor to Dennis, whose seat must be filled by a Democrat.

Meanwhile, both Alfred Sikes, the new FCC chairman, and Sherrie Marshall have been officially sworn in as commission members and have begun assembling their staffs. The other new member, Andrew Barrett, is expected to be sworn in next month.

NTI, Mich. Bell test automated billing service

Dawn Bushaus
Assistant Editor

Northern Telecom Inc. and Michigan Bell are testing a new automated billing system that could make operator assistance for collect, credit card and third-number billing a necessity of the past.

NTI is touting its Automated Alternate Billing Service as a "first-of-its-kind" voice recognition technology that automates billing.

The system is designed for use with NTI's Traffic Operator Position Systems. TOPS software in a DMS-200 toll switch and the TOPS Voice Service Node provide the technology.

The VSN generates voice prompts that ask the caller to dial two digits corresponding to the service desired. For third-party and collect calls, the system calls the party to be billed and asks if the charges will be accepted. The node will then either complete the call or tell the caller that charges have been refused.

A key feature of the billing system is its accessibility from rotary dial telephones,

continued on page 14

Going global

Long satisfied with their domestic market,

U.S. telecom vendors now are sailing

into tricky international market waters

FRITZ W. RINGLING

Until the early 1970s, the world telecommunications equipment market consisted of a constellation of national markets in which needs were satisfied by indigenous vendors. This structure existed for the sake of network homogeneity, universal service and public policy goals.

Network service providers were either regulated monopolies, privately or publicly owned, or government agencies with charters that outlined their duties and responsibilities. In most cases, the network service providers were the sole buyers of, and distribution channels for, equipment.

Equipment vendors were structurally organized into vertically integrated subsidiaries of network service providers or non-affiliated independent companies, and were either privately or publicly owned. Despite their legal structures, the various national vendors had, for the most part, organized themselves into oligopolies or cartels.

Competition was largely confined to markets of the developing world, or where domestic equipment vendors were deficient in technology or product functionality. To penetrate such markets, manufacturers usually had to establish domestic manufacturing facilities or transfer technology to the domestic carrier.

With the exception of GTE Corp. and ITT Corp., U.S. vendors did not have substantial offshore interests. AT&T's ownership of Northern Telecom was transferred to Bell Canada as part of the 1956 consent decree. On the other hand, foreign vendors had only a marginal share of the U.S. telecommunications equipment market, with significant penetration occurring only at the low end.

In this environment, users had little influence over the evolution of the telecommunications infrastructure, applications or customer premises equipment development. Public policy requirements and regulatory issues, rather than user needs, were paramount.

The telecommunications environment was thus the antithesis of the computer marketplace, where users and vendors dictated the evolution of technology and applications. Yet, the quest for a synergistic coupling of telecommunications and computer technologies and their applications always was a desirable goal. When vendors acted to make it happen, and users recognized the benefits, the existing market structure crumbled.

In Transition

The 1970s was the period of transition for the U.S. market. Foreign suppliers and their domestic distributors quickly seized the initiative and now dominate the low-end CPE market. The procurement process in foreign countries, on the other hand, witnessed few changes.

But then, U.S. vendors only made sporadic forays into offshore markets. They generally preferred to sign licensing agreements with foreign manufacturers, similar to the agreement between AT&T and Goldstar.

The 1980s have seen the restructuring of the global telecommunications marketplace that continues to gain momentum as the decade comes to an end. Although it is far from complete and has unevenly affected markets across the world, the process has had its most pronounced effect in three areas: the CPE market segment, where competition is the rule rather than the exception; the procurement process for network equipment where the existing vendor oligopolies are being dismantled; and the organizational structure where the publicly owned network service monopolies are either privatized or deregulated.

The restructuring process is being propelled forward by three key drivers. The de-emphasis of economic micromanagement provides the political and economic rationale. Technological advances in very large scale integration and photonics are revolutionizing the existing telecommunications infrastructure, providing the technological platform for changes. Finally, the devolution of processing power from mainframes to PCs is placing the user at the center of the computing universe. Subordinate factors pushing for a competitive environment are U.S.

continued on page 39

TABLE 1 TELECOMMUNICATIONS VENDOR MARKET SHARE

[illegible]	[illegible]	[illegible]	[illegible]
AT&T	10.0%	9.8%	9.2%
[illegible]	[illegible]	[illegible]	[illegible]
Siemens (including Rolm)	7.7	7.8	8.2
[illegible]	[illegible]	[illegible]	[illegible]
Ericsson	4.8	4.5	4.8
[illegible]	[illegible]	[illegible]	[illegible]
GPT	3.0	3.0	2.9
[illegible]	[illegible]	[illegible]	[illegible]
Philips	1.7	1.6	1.5
[illegible]	[illegible]	[illegible]	[illegible]
Bosch	1.3	1.4	1.6
[illegible]	[illegible]	[illegible]	[illegible]
STC	1.3	1.2	1.1
[illegible]	[illegible]	[illegible]	[illegible]

Source: Robert A. Sayles Associates, Inc.

Going Global *continued*

government policies for market reciprocity and European Economic Community integration plans for a single European market by 1992.

Clearly, the acceptance of competition, at least for some market segments, in Europe and the Pacific Rim countries has been driven by necessity. Technological innovations at both the transmission and switching levels have rendered much of the existing network infrastructure obsolete. Local suppliers are not always providers of equipment incorporating state-of-the-art technology. The cost of communications in an era where information transfer, rather than product movement, is the lifeblood of the enterprise has come to affect corporate investment decisions profoundly, placing some countries at a disadvantage.

In the final analysis, however, it is the transition from vendor-driven, technology-oriented advances to user-driven applications-oriented progress that is driving the market's quest for competition. The national telecommunications monopolies have little choice but to respond to this changing environment—users are demanding nothing less.

Grab a Piece of the Pie

The structural changes affecting the national telecommunications markets have prompted vendors to scramble for global market position, resulting in mergers, takeovers and joint ventures, as well as heavy investments in research and development. In 1988, the global telecommunications equipment market produced $115 billion in vendor revenues.

It is estimated that, in 1989, this global market will be worth $120 billion. The conservative outlook for 1992 suggests a $140 billion market. Thirteen vendors control slightly more than 50% of that market, with AT&T, Alcatel and Siemens controlling the rest (Table 1).

At this point, it is safe to assume that not all vendors in the marketplace will survive as independent entities and that some of the 13 largest companies may not either. Plessey has already proven vulnerable to a takeover attempt by GEC Corp. and Siemens. Standard Telephones & Cables and OKI also appear to be vulnerable.

Vendors whose primary market focus is outside telecommunications may decide to merge their telecommunications operations into larger suppliers that have a global reach and greater product depth. Philips NV, STC, GEC or Bosch could be placed into this category.

The United States has, for all practical purposes, only two vendors that supply a complete array of equipment—AT&T and Northern Telecom. It also is safe to assume that only a handful of vendors have the resources to become truly global players with standardized product offerings. The most likely candidates for this role are AT&T, Alcatel NV, Siemens (including Rolm), NEC, Fujitsu, Northern Telecom and LM Ericsson. In its transition from countrywide to worldwide market positioning, the industry consolidation will follow in the footsteps of the chemical, pharmaceutical or electrical power equipment industries, which have undergone analogous consolidations.

In addition to the transition from a vendor-driven to a user-driven market environment, vendors can expect this market to show marginal growth at best. Prices for hardware are eroding, even as there is a growing emphasis on software for upgrading equipment. Clearly, these conditions will accentuate the pressure on smaller vendors to merge or abandon the market.

The CPE market is projected to grow most rapidly. By far the largest portion of this growth is occurring outside the U.S. The principal driver is the pent-up demand for CPE-based networking solutions, which has been spurred by the liberalization of the CPE market itself. A growth rate of 8% to 10% for this market segment is a realistic projection.

The picture looks less pleasant for the transmission, cable and outside plant markets. These markets will shrink by about 6% to 8% during the next five years because of the price and performance of FO-based systems.

The central office switching market, on the other hand, will show an annual growth rate of between 3% and 6%, depending upon the replacement timetable for analog switches by network service provid-

continued on page 40

ers and the availability of capital in developing countries (Table 2).

U.S. companies have been slow to take advantage of the changing market environment. Unlike European vendors, they have had a domestic market large enough to satisfy their revenue needs, reducing the incentive to look abroad. Moreover, despite a growing trade deficit in telecommunications equipment, the U.S. network equipment market segment continues to be dominated by domestic suppliers (Table 3). Only at the CPE level have foreign vendors made significant inroads. And those successes in the CPE market were predictable, given the evolution of the domestic consumer electronics market.

Finding Frustration

Growth in the domestic market is now largely absent. Coupled with competition from foreign suppliers, revenue growth for U.S. vendors thus can only be secured at the expense of competitors, or through expansion into offshore markets (Table 4). Lack of experience, short-term profit requirements, foreign procurement procedures and the absence of financial subsidies have frustrated U.S. vendors, however.

TABLE 2 WORLD TELECOMMUNICATIONS EQUIPMENT MARKET
(In billions)

	1988 actual	1989 estimated	1992 projected
CPE	$ 40.0	$ 44.0	[illegible]
Transmission	23.0	22.0	19.0
Cable & OSP	11.5	11.0	[illegible]
Switching	40.0	43.0	53.0
Total	$115.0	[illegible]	[illegible]

Source: Robert A. Sayles Associates, Inc.

TABLE 3 U.S. CO SWITCHING AND PBX SUPPLIER MARKET SHARES, 1988

	CO switching 9.4M lines	PBXs 4.9M lines
AT&T*	[illegible]	[illegible]
Northern Telecom	40.0	20.0
Siemens**	[illegible]	[illegible]
Ericsson	[illegible]	N.M.
NEC	[illegible]	[illegible]
Fujitsu/GTE	N.M.	[illegible]
[illegible]	[illegible]	[illegible]
Mitel	—	10.0
Other	[illegible]	[illegible]

Source: Robert A. Sayles Associates, Inc./NBI/Datapro
*Includes AG Communications Systems, AT&T-GTE joint venture
**Includes Rolm acquisition from IBM Corp.

TABLE 4 CONSTRUCTION BUDGETS
(In billions)

	1988 actual	1989 estimated	1992 projected
[illegible]	[illegible]	[illegible]	[illegible]
Europe	40.8	44.0	50.4
[illegible]	[illegible]	[illegible]	[illegible]
Other	29.4	30.3	37.3
[illegible]	[illegible]	[illegible]	[illegible]

Source: Telephony/Robert A. Sayles Associates, Inc.

TABLE 5 PROJECTED WORLD NETWORK GROWTH—1988-1992
Access Lines (In millions)

	1988 actual	1989 estimated	1992 projected
[illegible]	[illegible]	[illegible]	[illegible]
North America	144	148	161
[illegible]	[illegible]	[illegible]	[illegible]
Other	41	44	55
[illegible]	[illegible]	[illegible]	[illegible]

Source: A.D. Little, Telephony, Robert A. Sayles Associates, Inc.

TABLE 6 COMPUTER VENDOR EUROPEAN MARKET SHARE 1987

[illegible]

IBM	36.5%	Apple	3.5%	ICL	4.0%
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
DEC	7.5	HP	4.0	Other	14.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source: [illegible], Robert A. Sayles Associates, Inc.

They are finding that entry into foreign markets continues to be subjected to a variety of visible and invisible barriers, especially when network equipment is involved. The fact of the matter is that the same is true for the U.S. market. In foreign markets, distribution channels, nomenclature and special interest groups are the dominant factors inhibiting market penetration by U.S. vendors. The long absence of U.S. vendors from the international scene has not been helpful, and this situation will not change in the near future.

Faced with a saturated domestic market and intensifying competition from foreign vendors, U.S. manufacturers must now make the investments in manufacturing and distribution facilities that will provide access to the real growth markets of Europe and the Pacific Rim (Table 5). Where joint ventures are appropriate, they also should be pursued.

To be successful, vendors must settle in for the long haul and obtain native acceptance. IBM is a good example of this strategy. And AT&T and Northern Telecom recognized this fact and established manufacturing facilities in Europe, bought equity interests in existing manufacturers and created joint venture operations. Northern Telecom now owns an 27.8% stake in the U.K.'s STC, and AT&T has formed a joint venture with Italtel to gain access to the Italian market. AT&T also has ventures with Telefonica, Lucky-Goldstar, Ricoh and Taiwan Telecommunications.

Northern Telecom, with its bases in Canada and the Caribbean, always has been less dependent than AT&T on one market, although more than 60% of Northern's revenues come from U.S. sales. On the other hand, the fact that only about 10% of Northern Telecom revenues come from non-North American

continued on page 42

TABLE 7 WORLD PBX AND KEY SYSTEM MARKETS
(In thousands of lines)

	[illegible]		[illegible]		[illegible]	
	PBX	KTS	PBX	KTS	PBX	KTS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Europe	4600	1800	4800	1900	5300	2100
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Other	2000	800	2100	850	2400	1000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Source: NBI, Datapro, Robert A. Sayles Associates, Inc.

Going Global *continued*

sales also attests to the difficulty of penetrating foreign markets.

Northern Telecom's progress is a sign of its persistence, which is a prerequisite for success, and the need to provide state-of-the-art technology. To its credit, AT&T, after initial attempts were rebuffed, concentrated its global marketing effort on areas without strong national vendors, where technology lags or where no strong link between a monopoly service provider and a vendor exists. For example, look at AT&T's efforts in the Netherlands, Spain, Italy, Switzerland, Korea and Taiwan. Markets in Britain (GEC-Plessey Telecommunications and LM Ericsson), France (Alcatel and Ericsson/CGCT), Germany (Siemens and SEL), Belgium (Alcatel and Siemens/GTE), Scandinavia (Alcatel and Ericsson) and Japan (Fujitsu, NEC and Hitachi) have been avoided, except for "commodity" products.

In Japan, both Northern Telecom and AT&T have generated major orders, but it remains to be seen whether these can be turned into "system" sales. U.S. government lobbying and NTT's desire for state-of-the-art technology are creating a positive climate. But significant sales in Japan, despite the two companies' technological strength, will be difficult.

Another growing market arena is the developing world, where significant work is under way to build telecom network infrastructures. Here, however, AT&T will be hard-pressed to compete with European and Asian vendors on price, due to the inherent capability of non-U.S. vendors to provide attractive financing packages.

The Learning Curve

Clearly, the key to success for U.S. vendors of network equipment is establishing a close working relationship with network service providers. In this regard, U.S. vendors have much to learn from foreign suppliers that have learned to make investments in which returns may be a long time in coming. The experience of Siemens or Ericsson in the U.S. market should serve as excellent examples.

In fact, despite the *de jure* openness of the U.S. market, domestic suppliers with international ambitions should analyze the struggle of foreign companies to succeed in the U.S. as a guide for what to expect overseas. For example, it took Northern Telecom six years to make a breakthrough in the U.S. Neither Ericsson nor Siemens is close to a breakthrough at this point, despite investing millions to adapt their CO switches for the Bell regional holding company market. And NEC, Fujitsu and Hitachi had to accept an analogous time frame.

Within the CPE market, successful penetration of offshore markets by U.S. vendors also will be difficult, but several key factors favor U.S. suppliers. First, the U.S.-produced products themselves are feature-rich and represent state-of-the-art technology. In addition, U.S.-made gear always has incorporated networking capabilities of growing importance to users elsewhere. Finally, rigorous competition within their domestic market has made U.S. manufacturers more cognizant of user requirements, a definite advantage in markets where user needs are just beginning to receive the recognition they deserve from local suppliers.

The track record for U.S. vendors in foreign markets has always been best when users were the paramount decision-makers and their requirements were the drivers. If the computer industry can serve as a guide (Table 6), U.S. CPE vendors are well positioned for market penetration in Europe, even though European CPE suppliers are in a much stronger position than their colleagues in the computer industry. In addition, revenue opportunities for the CPE market segment also will come from replacement of older technology with state-of-the-art equipment (Table 7).

Japanese vendors pose a serious challenge. Their strength is price competitiveness and product reliability. Their success, however, as well as that of the U.S. vendors, will ultimately depend on market reciprocity. Unfortunately, international trade issues have been politicized and have reached an emotional stage. European CPE vendors will, on the other hand, have to significantly adjust their marketing and pricing strategies to maintain their current position. This will not be an easy task, since their frame of reference continues to be the outmoded oligopolistic market structure. It could be that computer vendors will mount a serious challenge in Europe to both U.S. and domestic vendors. The success of Nixdorf is a case in point.

Northern Telecom and Network Equipment Technologies, the T-1 multiplexer vendor, have led the way for U.S. vendors. Both companies operate through national partners: STC for Northern Telecom, and British Telecom for NET. The two companies also have made long-term commitments to the

continued on page 47

Going Global *continued*

market. They market state-of-the-art equipment that is feature-rich and puts the user in control.

In addition, NET migrates into foreign markets in conjunction with its domestic customers. This user-oriented marketing strategy in combination with local manufacturing facilities bodes well for success. In contrast, relationships between partners with different priorities are the least likely to succeed, as the AT&T-Olivetti partnership illustrates.

Political Realities

In the final analysis, however, no matter how superior the technology, how rich the features or how user-oriented the marketing strategy, it will be the political climate at a given time that determines the probability of success or failure. For the moment all lights are green.

The lights may turn red, but it is a safe bet that no one is ready to engage in a protracted trade war over telecommunications equipment. The EEC, Japan and the U.S. all are eager to diffuse the issue. Popular sentiment, however, could be the bogy, and Congress might overreact (Table 8).

In the meantime, Japan's largest carrier, Nippon Telegraph and Telephone Corp., and the European PTTs are gradually opening their procurement processes. Progress will continue to be slow. But U.S. vendors only recently have entered offshore markets and would be misguided to expect immediate results.

TABLE 8 HOW AMERICANS RATE FAIRNESS OF U.S. TRADING PARTNERS

	Fair	Unfair	Unsure
Canada	80%	9%	12
Britain	[illegible]	[illegible]	[illegible]
West Germany	56	19	25
Taiwan	[illegible]	[illegible]	23
South Korea	30	42	28
U.S.S.R.	[illegible]	[illegible]	[illegible]
Japan	29	50	11

Source: Wall Street Journal poll taken January 9-14, 1989

U.S. vendors will serve their shareholders and potential customers best by accepting the fact that the return on investments into foreign markets will be slow in materializing. Deep pockets are an important prerequisite for success in the international marketplace. But they certainly are not the only one. An alternative, especially for smaller companies, may be a carefully chosen distributor or partner.

If an immediate return on investment is envisioned, it may be better to invest elsewhere. Competition is fierce. Special interest groups do not exist. Regulation and standards can be a barrier, and the business culture can be a problem. Significant rewards, however, do await those U.S. vendors that heed user needs and play the game according to foreign market rules. ■

Fritz W. Ringling is a Principal at Robert A. Sayles Associates Inc., a communications consulting firm based in Los Altos, Calif.

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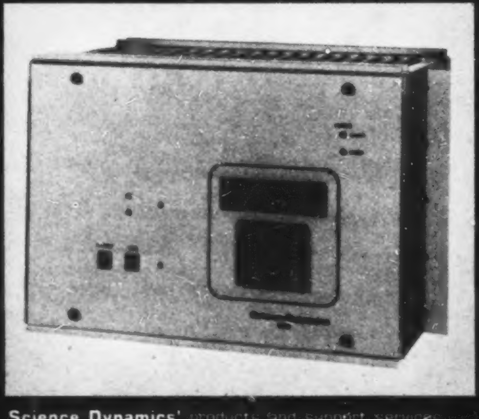

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BILLING SYSTEMS:
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TO BOLDLY GO WHERE NO PRODUCT HAS GONE BEFORE

Transforming billing systems into customer contact systems can speed up new service introductions

AND THEN THERE WAS ONE

CWA strike against Nynex continues; Ameritech and Bell Atlantic settle

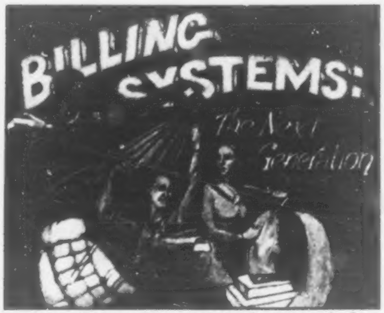
US SPRINT PLANS NATIONWIDE ISDN

IXC slates startup for early 1990

MONDAY, SEPTEMBER 4, 1989 Volume 217, No. 10

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS



To boldly go where no one has gone before with their new products and services, companies first must transform and re-energize their current billing systems into customer contact systems.
Cover art by Laura M. Doyle

DEPARTMENTS

58 ADVERTISERS' INDEX
6 IN MY OPINION
23 MEETINGS
60 MOVING AROUND INDUSTRY
44 NEW PRODUCTS AND SERVICES
43 THE WAY WE WERE

NEWS OF THE WEEK

8 AND THEN THERE WAS ONE
Life at most of the RHCs returns to normal as the CWA ends strikes at Ameritech and Bell Atlantic; the strike against Nynex continued as formal negotiations resumed

9 US SPRINT TO ROLL OUT NATIONWIDE ISDN
Claiming a first, US Sprint said it will roll out ISDN service at all of its 268 points of presence during the first quarter of 1990

10 BELLSOUTH UNVEILS NET MANAGEMENT SERVICE
The new service will allow customers to obtain billing information, order services and report trouble

11 AT&T OFFERS NEW BILLING SERVICE
This new service for business customers offers several billing options, summary reports, improved administration of corporate card programs and better fraud control

FEATURES

24 1989 RAY BLAIN OSP ACHIEVEMENT AWARDS
By Lloyd F. (Frank) Brisk. Following in Ray Blain's notable footsteps are award recipients Richard A. Patterson for noteworthy OSP achievement during the preceding year and O.C. (Chuck) Amrhyn for significant and sustained OSP achievement

26 1989 RAY BLAIN AWARD NOMINEES
By Lloyd F. (Frank) Brisk. *Telephony* tips its hat to these top-notch achievers nominated for the two awards honoring Ray Blain

28 BILLING SYSTEMS: THE NEXT GENERATION
By Alan A. Burgess. Transforming current billing systems into true customer contact systems is a crucial step toward speeding up new service introduction

34 IS YOUR SHOPPING LIST READY?
By Lloyd F. (Frank) Brisk. ICUEE '89 kicks off in a few short weeks in Louisville, Ky., with a dazzling array of OSP wares. A parade of the new products saddled up for the event starts on page 38

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In My Opinion

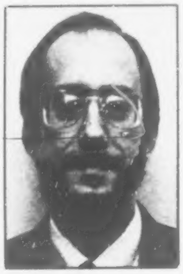
I'm not laughing anymore

For years, I've had a good time laughing at the cable television industry. In editorials and speeches, I would regularly question the intelligence of cable executives who seemed to spend their time trying to buy up all of the worst movies Hollywood ever produced. Sure, some of the shots were on the inexpensive side. But they were such easy targets it was hard to resist.

After all, these were high-powered business executives who didn't seem to understand that they had constructed and were running a communications network. These folks spent all their time and effort trying to sell *Leave It To Beaver* and *I Love Lucy* reruns.

These company managers were so short-sighted that some of them would even let their arch-enemy—the telephone companies—build and operate the cable systems for them so they could spend their energies coming up with creative programming like home shopping.

I would usually end my cable bashing with a snide crack about not taking the industry seriously until it created a counterpart to Bell Labs or Bellcore and began to explore and develop its network capabilities. As I said, they were easy targets to laugh at. But it's a lot harder to laugh at the cable folks these days.



By concentrating on pumping as much programming as possible down its coaxial pipe, the industry has created a product that America wants—and is willing to pay big bucks to get. I am a subscriber.

Through smart lobbying in Washington and generous campaign contributions, CATV succeeded in becoming the nation's only unregulated monopoly. And by jacking up rates and ignoring the resulting bad publicity, cable operators have boosted their profits and stock prices to levels telco executives couldn't imagine in their wildest dreams.

None of these developments has had much of an impact on the telecommunications industry, except that cable TV companies have replaced telcos as the monopolies that America most loves to complain about. And it has provided a convenient bad guy as telcos push to get into the video business.

But there is another development that merits some attention and, perhaps, some concern by the telecom industry. It seems the cable industry has finally discovered research and development.

CableLabs is an R&D operation funded by a consortium of cable system operators that represents more than 80% of the U.S. cable subscribers. Started last year in Boulder, Colo., CableLabs has a charter to study, analyze and develop new products and services for the cable industry. CableLabs has a staff of about a dozen. Funding for CableLabs comes from a 2¢ per month per subscriber assessment on cable operators, which produces an annual budget of about $9 million. So don't look for CableLabs to expand the frontiers of basic research, invent a new technology or win a Nobel Prize in the near future.

But that is not its job. Its purpose is to help its owners get more milk from their cash cows. But its mere existence shows that the new monopolists are beginning to suspect they might be in the high-technology communications business. And that is something the telecom industry should take seriously.

So, I'm not laughing at the cable industry anymore. CableLabs has convinced me that cable TV is an industry that should be taken seriously.

Then again, maybe the real purpose of CableLabs is to develop a 24-hour Music Wrestling Fashion Business Travel Comedy Shopping News Channel for left-handed teenagers that costs $25 a month.

Paul Travis

Telephony

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INTERTEC

NEWS OF THE WEEK

And then there was one: CWA, two more RHCs settle

Dawn Bushaus, Assistant Editor

Life at most of the Bell regional holding companies is returning to normal since the Communications Workers of America ended their strikes at Ameritech and Bell Atlantic last week.

At Nynex, some progress was made as formal negotiations were held again for the first time since the strike began there Aug. 6. Other RHCs have reached tentative agreements with their unions.

While most CWA employees returned to their jobs at Bell Atlantic, about 9000 members of the International Brotherhood of Electrical Workers continued to strike at New Jersey Bell. The telco's 5400 CWA employees refused to cross IBEW picket lines.

Illinois Bell, Michigan Bell, Indiana Bell, Ohio Bell, Wisconsin Bell and Ameritech services all reached tentative settlements with the CWA, but as of press time, only Ohio Bell, Wisconsin Bell and Ameritech Services had released terms of the agreements.

The other BOCs said they were waiting to inform employees before announcing the details.

If union members at Ohio Bell ratify the proposed contract, workers will receive a 2% basic wage increase during the first year and a 3% ratification bonus, which will not be added to the base. During the second year, CWA employees will get a 2.5% increase and during the third, a 3% increase.

Team incentive awards of between 1.5% and 3% in 1990 and between 2% and 4% in 1991 were also part of the pact, as were some job classification upgrades.

Family care provisions similar to the ones agreed upon at other RHCs, such as a one-year leave to care for an infant or ill family member and reimbursement for adoption costs, were negotiated.

In Wisconsin, the telco and CWA tentatively agreed on a 10% wage increase, 2.5% of which is a signing bonus. In addition, there is a potential for another 1.5% increase in the base wage, based on the company's performance.

The agreement also provides for a bonus award of up to two weeks salary based on the service and financial performance of the company.

Under the Wisconsin health care plan, which was already a preferred provider plan, CWA employees will receive some increases in vision and dental benefits, and a new early disease detection benefit will be introduced.

A family care package allowing an employee to take a leave of up to 12 months to care for a newborn or adopted child or an ill family member was also

CONTRACT SCOREBOARD

Company	Number of employees		Status	Tentative settlement terms
	CWA	IBEW		
BELL ATLANTIC	41,000	11,000	settled	7.5% wage increase
Bell of Pennsylvania		2000	settled	7.5% wage increase
New Jersey Bell		9000	on strike	
BELLSOUTH	64,000		settled	8%-11% wage increase
PACIFIC TELESIS	42,400		settled	9.4% wage increase
Pac Bell Directories		1600	settled	details not available
NYNEX	40,000	20,000	on strike	
AMERITECH	35,100	13,600		
Illinois Bell	3000		settled	(CWA) not available
		13,000	settled	(IBEW ratified) 9% wage increase includes $1000 bonus
Indiana Bell	4300		settled	details not available
		400	settled	(IBEW ratified) 9.75% wage increase 2.5% of which is a ratification bonus
Wisconsin Bell	4000		settled	details not available
Ohio Bell	10,200		settled	10.5% wage increase 3% of which is a ratification bonus
Michigan Bell	13,000		settled	details not available
Ameritech Services	600		settled	9% wage increase 2% of which is a ratification bonus
		200	settled	(IBEW) 10% wage increase includes $1000 bonus
U S WEST	41,000		settled	10% wage increase includes $600 bonus
SOUTHWESTERN BELL	45,000		settled	10% wage increase includes $1000 bonus

tentatively agreed to at Wisconsin Bell.

At Ameritech Services, CWA employees are slated to receive a 2% base wage increase during the first year and a 2% ratification bonus not included in the base. Workers can expect a 2.5% increase in the second and third years.

Health care benefits at Ameritech Services will include chiropractic care if the new contract is ratified, and an increase of 10% for vision care. Dental benefits will increase by 20% and the $50 lifetime deductible will be eliminated.

Ameritech Services and the CWA also tentatively agreed to a family care plan, and CWA workers at all three companies will be able to participate in prepaid job training programs that provide employees the opportunity to further their training and education.

In its agreement with the IBEW, which was ratified in July, Illinois Bell provided a similar job training program under which tuition is prepaid.

The agreements with the remaining Ameritech BOCs are expected to resemble the settlements that have already been reached at other companies.

Meanwhile, negotiations resumed in the middle of last week between Nynex and the CWA. The contract dispute between the two parties has turned into the most bitter of the phone strikes that hit the nation at the beginning of August.

A Nynex spokesman declined to comment on the climate of the talks.

A spokesman for New York Telephone said vandalism has been a problem since the strike began. The telco has recorded about 200 incidents of vandalism, primarily severed cables, which has caused disruption in service to about 40,000 customers.

Separately, the CWA also reached an agreement with Northern Telecom Inc. where 600 workers had been striking since July 20. The union voted last week to ratify the contract, which calls for a 10% wage increase over three years. T

Sprint announces 1990 ISDN debut

Dawn Bushaus
Assistant Editor

Claiming a first, US Sprint announced last week that it will roll out ISDN service nationwide during the first quarter of 1990.

Through the use of signaling system 7, which Sprint has fully deployed, the company will make ISDN primary rate interface (23B+D) available from all of its 268 points of presence to customer premises equipment via direct access. The service will be rolled out as customers demand it.

According to Tom Carroll, group manager of Sprint's Enabling Technologies Division, six to 12 large customers have requested the service for the first quarter of 1990.

ISDN customers will be able to access Sprint's Ultra 800, Ultra WATS, VPN virtual private network, Switched 56, Switched 64 and Telenet network services using the PRI.

Sprint has been testing ISDN with about 30 vendors at its Burlingame, Calif., ISDN laboratory for the past year, said Terry Kero, director of network systems planning for Sprint. Kero also serves as director of the ISDN lab.

During the past two weeks, Sprint has invited about 100 customers to tour the facility where it is demonstrating ISDN capabilities including clear-channel, coast-to-coast voice, data and video.

"We are following [CCITT] standards in the Sprint network," Kero said. "Our concern is how the vendors are implementing the standards," but since the standards allow for some flexibility, vendors do not always implement them in the same way. The purpose of the lab is to identify and correct the differences, he said.

Sprint is testing the compatibility of its ISDN features with major PBXs including AT&T's System 85, Northern Telecom's SL-1 and SL-100, Fujitsu's Focus 9600 and Siemens' Saturn 2. In addition, the carrier is negotiating with NEC America and Rolm to test versions of their PBXs.

Sprint customers who want ISDN realize they may have to modify or upgrade their PBXs to accommodate the D channel, Carroll said. Therefore, the company is not overly concerned that the demand for ISDN will force hasty deployment.

"We intend to release ISDN in a controlled fashion," Carroll said.

And for customers who cannot afford to upgrade or replace their PBXs, Sprint is testing a Teleos integrated access module that will allow ISDN interfacing at a lower cost.

"Sprint is looking at the whole market," Carroll said.

Sprint is still in the process of determining the prices for its new service offerings, but Carroll said cost will be divided into three charges—an installation charge, a monthly charge and a usage charge.

"We will be pretty much on par with AT&T as far as the installation and

continued on page 10

A Hong Kong first

Workers help install Hong Kong's first underwater fiber optic cable, which stretches between the Stanley peninsula and Cape D'Aguilar on the southeastern tip of Hong Kong Island. Construction of the 4.5-km cable, which has 24 fibers that can each handle speeds of up to 565 Mb/s, was completed last month.

monthly charges are concerned," he said. The usage charge will be set about 15% lower than AT&T's, he added. AT&T deployed primary rate ISDN in 18 U.S. cities last year.

The average customer will probably pay about $400 a month to use the D channel, Carroll said. Prices for voice channel usage, VPN or WATS service will not change. ■

BellSouth unveils net management

Paul Travis, Executive News Editor

BellSouth took a major step toward giving customers greater control in managing their complex communications networks when it introduced a new network management service last week.

The new service is the first step in developing an overall Customer Network Management architecture for South Central Bell and Southern Bell, the company said. The service, called CNM-Administrative Management Service, allows customers using personal computers to obtain personal billing information, order services, report trouble and access individual network management services. Customers also can use the service to send electronic messages to telcos.

The service also will allow enhanced service providers to electronically access network operational support systems under BellSouth's open network architecture plans.

BellSouth said CNM-AMS is the first such product to be generally offered by a Bell company. It was developed by BellSouth Information Systems and BellSouth Services and demonstrated last week at the annual meeting of the Southeastern Telecommunications Association in Nashville, Tenn.

The service was developed because customers wanted greater flexibility in managing their network, according to Ken Schinert, product manager, customer network management, BellSouth Services.

"It is our intent to add value to the services we provide our customers by giving them more control. We do not look at this as the only service we plan to offer. We will be developing other things based on what the customers desire. We hope to further integrate all of our network management products on a common platform, using either text or graphical interfaces," he said.

Customers can access the menu-driven service via dial-up lines at 1200 b/s or through private lines at 9600 b/s. Customers can use the service as a gateway to other network management services, including the ESSX Customer Administration Service and Digital ESSX CAS, which allow customers to rearrange their ESSX service, and the FlexServ service, which allows customers to manage and rearrange their dedicated voice and data networks.

The service will be offered on a regionwide basis, allowing customers with offices in several locations to manage their networks from a central point. A customer can place an order in Atlanta for new service in Miami, for example. InterLATA traffic will be carried on BellSouth's inter-

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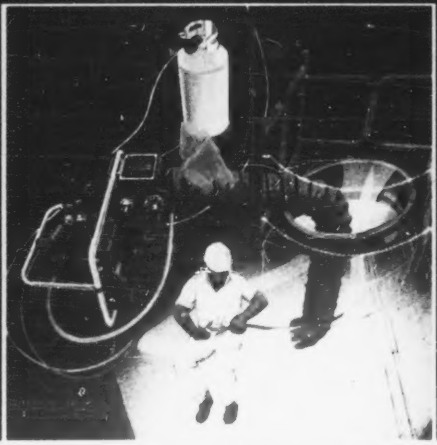

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MAN IN THE ITU HOT SEAT Pekka Tarjanne sees profound changes and hectic times ahead for the ITU

PUERTO RICO TOO TOUGH FOR HUGO

Most local service survives as Hurricane Hugo devastates island

NEW RATE PLAN TO THE RESCUE?

New York Tel seeks price caps to augment incentive regulation

MONDAY, SEPT. 25, 1989 Volume 217, No. 14

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

For someone stepping into one of the hottest seats in the telecommunications world, Pekka Tarjanne is taking on the mantle of ITU secretary general and the profound industry changes that come with it quite calmly. Cover photo by Jaakko Savolainen

DEPARTMENTS

94 ADVERTISERS' INDEX
6 IN MY OPINION
32 MEETINGS
66 MERITS AND MILESTONES
96 MOVING AROUND INDUSTRY
68 NEW PRODUCTS AND SERVICES

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NEWS OF THE WEEK

8 PUERTO RICO TOO TOUGH FOR HUGO
Dial tone continues for 93% of Puerto Rico Telephone's customers in the wake of Hurricane Hugo

9 NEW YORK TEL PRICE-CAP PLAN DRAWS PRAISE
Some observers believe the telco's latest plan for regulatory reform and price increases will help it recover from the rate moratorium imposed in 1987

9 BELLCORE, SWB PLAY TELEPHONE HI-FI
Southwestern Bell Telephone demonstrates its latest breakthroughs on 7-kHz audio-data technology at a Bellcore industry forum

10 US SPRINT LANDS TWO BIG CONTRACTS
The long-distance carrier unveils its FTS 2000 center and announces major deals with both PepsiCo and the FBI

FEATURES

33 NOT JUST THE FAX
By John Williamson. Even though facsimile is booming in Europe, many carriers refuse to release their grip on the remaining telex market

38 WILL THE FAX BOOM GO BUST?
By Laura O'Brien. Some technologies, like fads, come and go. Is the newest craze for facsimile machines destined to slip from memory, just as the hula hoop slipped from baby boomers' waists?

48 MAN IN THE ITU HOT SEAT
By John Williamson. Former physicist and Finnish politician, Pekka Tarjanne calmly views the profound changes, and probable hectic times, ahead for the UN agency he soon will lead

59 VIDEOTEX ENTERS ANOTHER DIMENSION
By Jean-Pierre Temime. ISDN has catapulted France Telecom's Teletel videotex system into a brave new world, where a whole range of services is possible

In My Opinion

What sort of Christmas present is PCN?

There has been no shortage of candidates to pick up the $3.5-billion tab for building a personal communications network in the U.K. By the time the Sept. 14 deadline passed, 18 major international league players grouped into five consortia had thrown their hats into the ring, hoping to pick up an operating license.

Two—and possibly three—license winners should be announced by the end of the year. The question is: Will a PCN license turn out to be much of a Christmas present?

PCN is space-age stuff. It adds a domestic dimension to cellular telephony. It is at once cheaper, more user-friendly and of much higher capacity than cellular. If it's not exactly an all-weather, anytime, go-everywhere citizen-specific communications media, its advocates say that it is most of the above.

As with all space-age stuff, though, there are disbelievers. In this case the skeptics maintain that current technology cannot handle all that is being promised by PCN promoters and that this U.K. initiative is likely to incur the wrath of international standards-making bodies. There's also a feeling in some quarters that there isn't a good commercial case for another mobile system, following as it will in the footsteps of cellular and cordless pay phone services.

On the technology front it is undeniable that there are still some gaps to fill and refinements to be made. Experience indicates, though, that technical solutions can be found quickly if a new, untapped mass market is perceived to exist.

As far as standards are concerned, the U.K. has attempted to forestall international criticism by requiring PCN to be based either on the Pan-European GSM digital cellular standard or the emerging digital European cordless telephone specification. It is more likely that PCN will use the Pan-European standard because it can be made rapidly available once intellectual property rights issues are sorted out.

Premature use of DECT, on the other hand, would probably antagonize its European sponsors. Continental European interests may not applaud the U.K.'s attempts to hog the mobile spotlight, but they have no substantial standards beef in the case of PCN.

What is left is the commercial logic of PCN, on which the requisite technology advances also may depend.

I presume that intensive market research has been carried out before manufacturers and operators of global repute would commit themselves to the tremendous investments necessary to implement PCN. What this research reveals is that people will pay for cordless capability. The trick will be to pitch the cost of PCN ownership over time at the appropriate level.

If all goes well, the Department of Trade and Industry, when handing out the licenses, could well play Santa.

John Wil

Telephony

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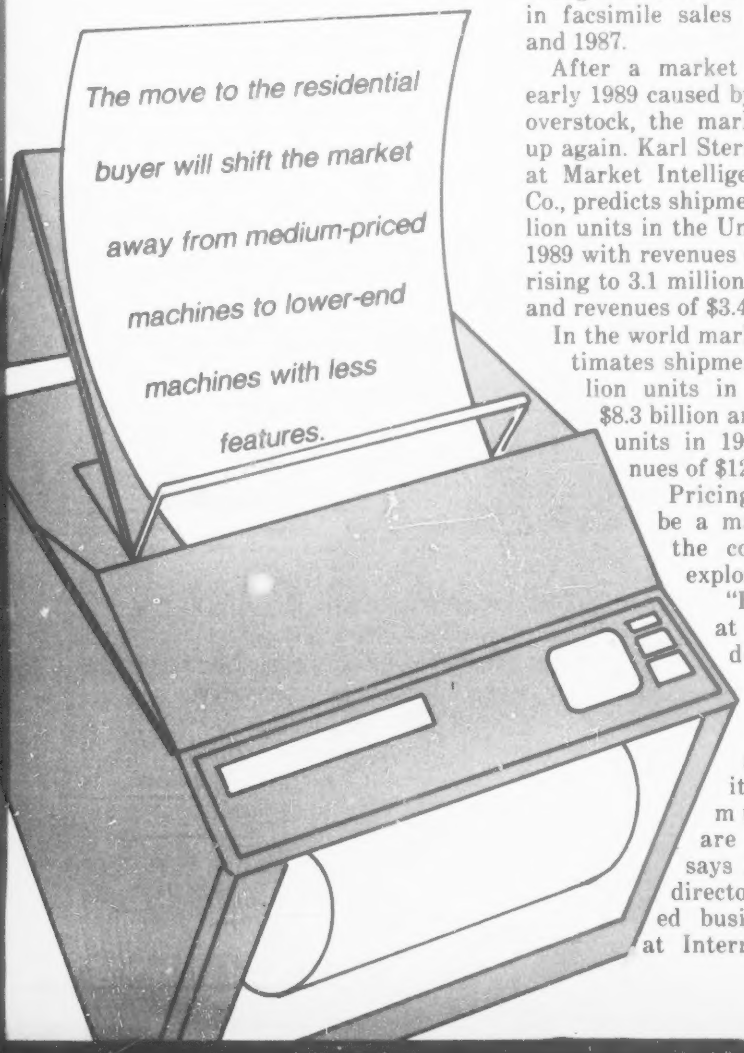
INTERTEC

Will the fax boom go bust?

Although it is not as lucrative a market now as it was in the mid-1980s, the fax field will remain fertile in the near future

LAURA O'BRIEN
Associate Editor



The move to the residential buyer will shift the market away from medium-priced machines to lower-end machines with less features.

Technologies, like fads, come and go. Is the newest craze for facsimile machines destined to whirl away in a cloud of telecommunications memories, just as the hula hoop slipped from our waists?

Past sales and projections into the 1990s indicate fax fever will stay awhile, although the market will change substantially and produce diminishing revenues compared to the mid-1980s fax epidemic.

That boom was fueled by the introduction in 1985 of lower-priced Japanese-produced Group III standard machines to the United States. The explosion brought an 89.7% revenue growth in facsimile sales between 1986 and 1987.

After a market slowdown in early 1989 caused by fax machine overstock, the market is picking up again. Karl Sterne, an analyst at Market Intelligence Research Co., predicts shipments of 1.3 million units in the United States in 1989 with revenues of $2.1 billion, rising to 3.1 million units by 1995 and revenues of $3.4 billion.

In the world market, Sterne estimates shipments of 6.3 million units in 1989 earning $8.3 billion and 10.4 million units in 1995 with revenues of $12 billion.

Pricing appears to be a major factor in the continuing fax explosion.

"Fax is priced at a point that doesn't mean a big investment, and the return and capabilities for communication are very large," says Ann Palermo, director of integrated business systems at International Data Corp. "Fax is also easy to use. There are people using fax who don't know how to use a personal computer."

"The sheer practicality of print communication is the No. 1 thing," says Toshiba spokesman John Lesser. "And when you combine that with ease of use, you have a beautiful product."

Sharp Leads the Pack

Leading the fax market is Sharp with a 20% market share and shipments of 240,000 fax machines in 1988. Following are Ricoh, Canon and Murata.

None of these manufacturers expect the boom of the 1980s to last into the next decade. All will see sharp reductions in revenue growth after 1989, compared to the period between 1986 and 1988 during which revenue growth averaged 39%, say the analysts. Decreasing prices—not fewer sales--are to blame, Sterne says.

"Overall, the market is growing at a healthy rate. But there won't be the same frenzy in the market," says Sterne, who recently helped compile MIRC's study, "U.S. and World Facsimile Markets."

Continued market growth will come from lower fax machine prices, new market distribution and new customers. More small businesses will buy fax machines as prices drop below $3000. And residential users won't jump on the fax bandwagon until prices dip under $500, analysts predict.

"The residential market will be new but it will not grow rapidly. It will grow at a more controlled pace. In the office, a fax is a requirement, but that is not the case at home. You don't have to have a fax. A purchase is dictated less by need than by desire," Sterne says.

Link Resources' recent national work-at-home survey shows that there are 2.2 million at-home workers who rely on modems. Of

continued on page 42

The Fax Boom *continued*

these, 500,000 households report using fax devices.

As many as 500,000 more fax machines will be bought for at-home use within the next year, which means that about 33% of total fax machines are sold to home offices, says Carol D'Agostino, a Link analyst.

New markets will blossom in public places with the largest growth in airports and hotels where people will be able to use credit cards to fax messages. Easily accessible public fax machines will eventually put fax service stores out of business, [MIRC's] Sterne says.

Courting the Home User

The move to the residential buyer will shift the market away from medium-priced machines to lower-end machines with less features. Manufacturers say consumers will initially want machines that only have paper cutters and auto-feeding of multiple originals, but they will eventually desire machines that provide half-tone, automatic dialing and combination telephone-fax features.

Ricoh reports tremendous interest from small businesses, but little from residential users.

"People are finding that, if they want to do business, they need a fax machine. As people get machines, they wonder how they got along without them. After a while, you will see them upgrade their machines," says Garry Waddell, manager of product planning-document fax, at Ricoh.

Z. Gary Miller, product market manager for fax at Xerox, says upgrading should be expected because "the market has changed from a centralized market to a small machine market because of popularity and price. As the [small market] fills up, the [mid- and large-sized] markets will grow as people who bought the small machines wish they hadn't."

New markets will blossom in public places with the largest growth expected to occur in airports and hotels where people will be able to use credit cards to fax messages. Easily accessible public fax machines will eventually put fax service stores out of business, Sterne says.

These new markets are changing the distribution process for fax machines. Instead of buying through interconnect companies or other customer premises equipment operations, users will increasingly buy fax machines from the same retail outlets that now sell everything from telephones to toaster ovens.

"Sharp's edict is to go retail. People are buying fax machines today for small business and home offices pretty much the way they buy consumer products like VCRs," says Dennis McLaughlin, Sharp's national sales manager, personal home office division. "Salespeople aren't able to call on these people, yet they need machines," he said.

The Facts on Fax

As the fax market evolves, so will the role of the fax machine, analysts and manufacturers agree.

"As more and more higher featured fax products are offered at lower prices, fax is switching from a telecommunications office systems product to a lower-end business product," Toshiba's Lesser says.

IDC's Palermo agrees. "I see a movement away from the fax in its traditional role—one fax in a central location—to automation of the fax and integration on a local area network or attachment to a host system," she says.

New innovations and pricing will dictate how smoothly fax machines move into new environments. Manufacturers estimate that continually changing technology and continually lower prices make current fax machines outdated within nine months.

Analyst Sterne is expecting the Group III fax market to stagnate, crippled by standards that limit technical improvement. "Nothing exciting will happen technologi-

continued on page 46

TABLE 1 FAX MACHINE MARKET: UNIT SHIPMENT AND REVENUE FORECASTS (U.S.), 1985-1995
(In thousands of units and millions of dollars)

Year	Unit shipments (000)	Revenues (millions)	Revenue growth rate (%)
1985	157.6	575.2	—
1986	191.5	[illegible]	7.8
1987	454.0	1177.9	89.7
1988	[illegible]	[illegible]	46.5
1989	1366.8	2115.5	22.6
[illegible]	[illegible]	[illegible]	[illegible]
1991	2138.1	2643.9	10.6
[illegible]	[illegible]	[illegible]	[illegible]
1993	2707.4	3022.8	6.0
[illegible]	[illegible]	[illegible]	[illegible]
1995	3156.2	3387.0	5.9
Compound Annual Growth Rate, 1985-1995: [illegible]			

Note: All figures are rounded.
Source: Market Intelligence Research Company

cally with Group III except the prices will go down and the reliability will go up."

But manufacturers are trying to be innovative and match customer requests. Karen Adelman, AT&T's fax product marketing manager, says customers are requesting machines that are easy to use and equipped with answering machines, telephones, memory and mailbox protection. Customers also want networking capability, automatic document feeders, auto-dialing, paper cutters, operator display, half-tone and confirmation of report.

Manufacturers would like to offer inexpensive plain paper machines and are working toward that goal. Currently, most Group III machines use thermal paper, which is messy and nonpermanent. The plain paper innovation would "revolutionize" the Group III standard and breathe new life into it, says Ricoh's Waddell. Plain paper machines are available now, but they cost about $3500.

"The worst thing today about Group III is the sleazy thermal paper. More faxes will become plain paper and, as that happens, the price will come down," says MIRC's Sterne.

An alternative or addition to Group III is the fax board. A fax board permits users to automatically send personal computer output as fax documents to Group III machines on public telephone lines, eliminating the need for a separate fax machine in an office. Fax boards produce a higher quality copy than a fax machine and are effective for mass producing documents.

The market share is small for fax boards because users need a personal computer and they must be computer literate, says Sterne, who doesn't think fax boards are as cost-effective as facsimile machines.

In 1988, 41,000 boards were shipped, bringing in $23 million in revenues. In 1989, projected shipments will reach 88,000 boards with $41 million in revenues, according to MIRC's study.

Group IV fax machines will provide the technical advancements people will be looking for by 1995, Sterne predicts. Group IV is completely digital with very high-speed and resolution. Documents that take several minutes on a Group III fax are transmitted in a matter of seconds on a Group IV machine.

Top 1988 Group III facsimile vendors

Sharp
Murata
Ricoh
Canon
Panafax
Pitney Bowes
Toshiba
Fujitsu
Harris/3M
Xerox

Names supplied by Market Intelligence Research Co.

> *'The worst thing today about Group III is the sleazy thermal paper. More faxes will become plain paper and, as that happens, the price will come down,' says MIRC's Sterne.*

But Group IV is also high priced and incompatible with today's analog telephone network. Even by 1995, less than 10% of the units sold will be Group IV machines. But those sales will account for more than 10% of the money spent on faxes, Sterne says.

Manufacturers and vendors are hesitant to jump into wide-scale production of Group IV machines because of limited market appeal. The top four vendors that commercially offer Group IV machines in the United States are Ricoh, NEC, Fujitsu and Canon. On the other hand, AT&T and Toshiba have no Group IV machines available. Sharp manufactures the machines, but does not offer them commercially. And Xerox offers the machines only in Japan.

"The key that will drive Group IV is the new digital phone systems and that means the integrated services digital network. Without ISDN, it is not cost-effective to have Group IV unless you're a high-volume fax company," says Joe Cosgrove, Sharp's national marketing manager. In fact, some telecom analysts think Group IV fax demand could help drive up ISDN demand.

There's a Catch

Along with fax popularity has come the unwanted "junk fax"—the unsolicited advertisements and promotional materials that companies send out to a captive fax audience. Most disturbing to businesses is the fact that junk fax transmission ties up their machines and uses up their paper.

The outcry has been loud enough to stimulate action at both the federal and state level. Twenty states have acted on laws to restrict junk fax transmission.

The House telecommunications subcommittee designed a bill, now before the Energy and Commerce Committee for further action, to let consumers use a clearinghouse function to tell telephone companies they don't want junk fax or auto-dial calls.

The bill would restrict unsolicited fax messages, calls to cellular phone customers and calls made by auto-dialers. The Federal Communications Commission would implement rules and penalties, as well as maintain a list of customers who do not want unsolicited calls.

The legislation doesn't bother fax vendors. "I don't think much of those laws. The problem is junk fax is not as big as the hype the lawmakers make," says Cosgrove.

With the fax craze heating up legislators and Group IV machines on the horizon, fax machines won't join dusty hula hoops in the closet any time soon. ■

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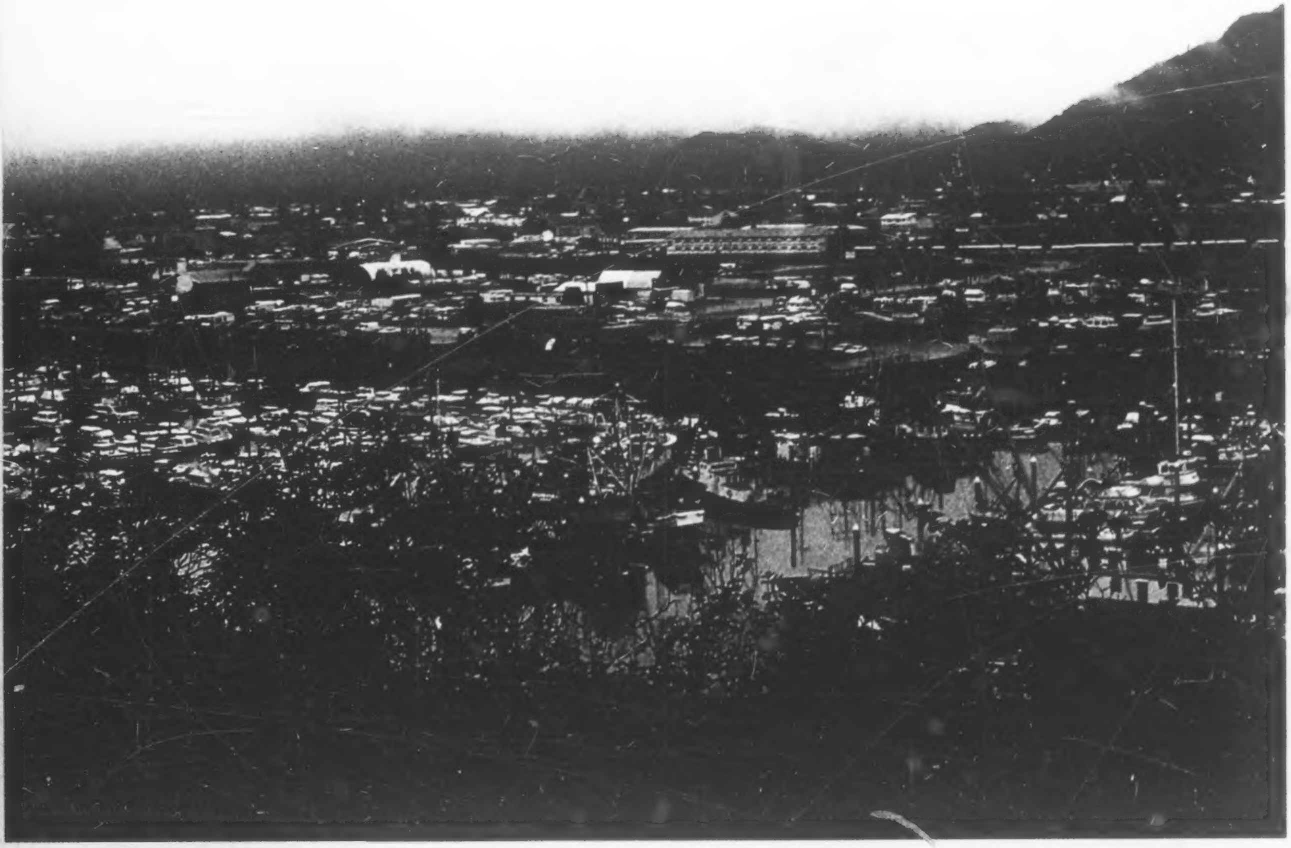

THE VALDEZ EXPERIENCE Tiny telephone cooperative plays a big role in the Exxon Valdez cleanup

RATE SETTLEMENT REVIVES SW BELL NETWORK PLAN

Telco to upgrade 100 Missouri switches to digital within three years

AT&T CHALLENGES BT ON BRITISH SOIL

Istel purchase puts company into U.K. information services market

MONDAY, OCT 2, 1989 Volume 217, No. 15

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

Since March 24 the eyes of the world have been on Valdez, Alaska, a tiny fishing village that blossomed in size overnight when the worst environmental disaster of 1989 happened there. As the cleanup continued, the city, its small telephone cooperative and its residents all got more than their 15 minutes of fame. Cover photo courtesy of Northern Telecom

NEWS OF THE WEEK

8 SW BELL MODERNIZATION PLAN REVIVED
A Missouri rate settlement paves the way for Southwestern Bell to begin aggressive replacement electromechanical switches

9 AT&T MOVES INTO U.K. VANS TURF
With its acquisition of Istel, AT&T is challenging long-time collaborator British Telecom in its home territory

9 U S WEST ANNOUNCES COMMERCIAL ISDN
The RHC signs its first primary rate customer, Phoenix-based American Creditors Bureau

10 UNIONS FARE WELL IN HEALTH CARE BATTLE
Analysts say the CWA and IBEW workers did better than expected in retaining health benefits in this year's round of RHC contracts

FEATURES

38 THE BARGAIN BASEMENT BLUES
By Michael Warr. Telcos are singing the blues because of the cost and complexity of current fiber optic test equipment. What they want is rugged, simple test equipment at bargain basement prices

44 THE VALDEZ EXPERIENCE
By Dean Moore. Life is slowly returning to normal for the tiny Alaskan fishing village thrust into the limelight this spring when the Exxon Valdez dumped 11 million gallons of North Slope crude into the water. Thanks to the city's tiny telephone cooperative the recovery efforts went smoothly

52 TO FLOAT OR NOT TO FLOAT?
By Robert W. Cubbage and Paul A. Littlewood. The Sonet standard specifies five different ways to map DS1 signals. But which road is really best for network providers?

DEPARTMENTS

82 ADVERTISERS' INDEX
6 IN MY OPINION
35 MEETINGS
84 MOVING AROUND INDUSTRY
64 NEW PRODUCTS AND SERVICES
62 THE WAY WE WERE

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In My Opinion

Bringing videotex home to meet mom

Minutes before writing this, I checked tomorrow's weather forecast, scanned the latest news headlines and looked up airline schedules for an upcoming business trip. I also could have booked the flights. I accomplished all of these tasks on my home personal computer, a feat that leaves my mother shaking her head in amazement.

Most Americans would undoubtedly enjoy these services. But they remain unknown or out-of-reach to all but those who own PCs and modems.

The existing service providers are struggling just to reach that small user base. Their relatively poor record penetrating even that tiny market is either an indictment of poor marketing or merely reflects the high cost of usage. But the result is the same: minimal market penetration.

This is not the way to build the mass markets that videotex providers say they crave. And it's no way to reach the much-heralded information age in the United States that federal lawmakers, the Federal Communications Commission, state public utility commissioners and U.S. District Judge Harold Greene all say they want.

To saturate this country with videotex services will take a concerted effort from both the private and public sector. And telcos must be allowed to become fully involved in the information business, including providing data manipulation services for videotex providers.

Although there has been little besides talk coming from Washington lately, private industry is moving. Southwestern Bell's executives may be the Star Trekkers of our time as they venture where none have gone before by conducting the first mass market videotex trial in Houston. That trial, which so far has been successful, includes the distribution of inexpensive and relatively easy-to-use terminals.

Observing this success, several videotex companies formed the Videotex Marketing Consortium this summer. The first order of business has been to get quotes from terminal equipment makers to get those terminals into the hands of consumers. The next effort will be to develop industry standards.

The goals and efforts of the new consortium are laudable. The industry clearly has learned from earlier efforts at mass marketing new products and services. Remember how Gillette practically gave away shavers to provide a lasting market for razor blades?

It will take more than cheap and easy-to-use terminals to sell videotex. It also will take good marketing. That's why another development is worthy of praise. Recently, Prodigy—the Sears/IBM videotex venture—and Rochester Telephone joined forces. While Prodigy unfortunately depends entirely on home computer users, it deserves credit for introducing many of those users to an inexpensive source of information and services.

The deal seems to be a natural match. Prodigy saves money because of the centralized computer services that Rochester Tel can provide. In addition, Prodigy receives marketing help—and, maybe in the near future, billing services—that bring with it the customer confidence and name recognition that few could match. And Rochester Tel gets a new source of revenue. If it works in practice as well as it does on paper, then other telcos may pursue similar ventures.

Clearly we still have far to go. But we are getting closer. The day my mother tells me that she used her telephone/terminal to reserve a hotel room, I will know that the information age definitely has arrived.

Chal F. Mason

Telephony

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Bell company labor contracts scoreboard

Company	Wages				Health	Vision	Dental	Prepaid
	Yr. 1	(Bonus)*	Yr. 2	Yr. 3	care			tuition
Bell Atlantic	3%		2.25%	2.25%	new PPO†[1]	up 25%	up 20%	not part of contract but co. will prepay in some cases
BellSouth	4%		1%	1%	new PPO[2]	up 10%	up 10%	not part of contract but co. will prepay
Ameritech **Illinois Bell**								
CWA	5%	$1000[3]	2%	2%	had PPO	up 20%	up 20%	$2200/yr.
IBEW	5%	$1000	2%	2%	had PPO	up 20%	up 20%	$2200/yr.
Indiana Bell								
CWA	5%	2.5%	2.5%	2.5%	had PPO	up 20%	up 20%	$750/yr.
IBEW	5%	2.5%	2.5%	2.5%	had PPO	up 20%	up 20%	$750/yr.
Michigan Bell	5%	3%	2.5%	3%	had PPO	up 23%	up 33.5%	18 credit hours/yr.
Ohio Bell	5%	3%	2.5%	3%	had PPO	up 15%	up 10%	$1500/yr.
Wisconsin Bell	5%	2.5%	2.5%	2.5%	had PPO	slight increase	up 20%	18 credit hours/yr.
Ameritech Services								
CWA	2%	2%	2.5%	2.5%	had PPO	slight increase	up 20%	yes[5]
IBEW	5%[4]	2.5%	2.5%	2.5%	had PPO	slight increase		yes
Pacific[6] Telesis	3.1%		3.7%	2.6%	new PPO	new PPO	new PPO	no
Pac Bell[7] Directories (IBEW only)	4%		3%	3%				
Southwestern Bell	5.25%	$1000	2.25%	2.25%	had PPO[8]	up 20%	up 20%	not part of contract but co. will prepay
U S West	5%	$ 600	2.5%	2.25%	new PPO	percentages not available		no

*Bonus indicates a lump-sum payment upon ratification

†PPO stands for preferred provider option: union employees receive greater benefits when they choose a physician who belongs to a network of health care providers agreeing to charge lower rates because of anticipated usage

[1] Under previous contracts Bell Atlantic union members had to pay $150 deductible per individual or $450 deductible per family; that deductible is extended to include hospital care

[2] BellSouth already had a network of hospitals for union employees to choose from; they have agreed to establish a network of physicians as well

[3] Illinois Bell's lowest- and highest-paid union employees will receive a $5-a-week raise and a $1000 bonus instead of the flat 5% raise in the first year

[4] Ameritech Services IBEW first-year wage increase of 5% includes a lump-sum payment of $1000

[5] Ameritech Services is offering prepaid tuition with no maximum limit, but the company has set aside an undisclosed amount of money to fund the benefit, and when funds are depleted, the company will no longer prepay

[6] Rejected by union workers Sept. 22

[7] Pacific Bell Directories and the IBEW will follow the Pacific Bell-CWA benefits package; in addition, sales representatives will not receive wage increases since they work on a commission basis

[8] Employee co-payment for doctor visits increases from $5 to $10, and fees for prescriptions increase from $5 to $8; employee co-payment for emergency room, however, decreases from $25 to $20, and if employee is admitted there is no co-payment

time, become more widely available.

"We are not trying to overhype and oversell ISDN. We know what problems we faced in the trials and we want to work out those problems," Meldrum said. 🆃

Unions fare well in health care battle

Dawn Bushaus, Assistant Editor

By this time, most of the Bell regional holding companies and their unions have managed to negotiate workable contracts for the second time since the breakup of AT&T. The contracts, some not yet ratified, offer union members innovative family care packages that resemble those in AT&T's agreement with the Communications Workers of America, and health care packages that still cost union members relatively little.

Although they said they see no clear-cut winners or losers in the settlements, some analysts said they are surprised the unions were able to hold onto health care packages without sharing much in the cost of coverage.

"The CWA did better than I anticipated," said Fritz Ringling, analyst with Robert A. Sayles Associates Inc. "They got the most they could on medical benefits. I didn't think the telephone companies would be that generous.

"One could argue that the telephone companies took the less than average wage settlement and gave in on health care," he said.

Wage settlements ranged between 8% and 10% in addition to cost of living increases over the three-year lives of the contracts. All of them offered union employees team incentive award programs or profit sharing plans that provide for guaranteed minimal percentage bonus increases and offer a potential for greater increases based on corporate performance.

To date, CWA members at BellSouth, U S West and Southwestern Bell have ratified their contracts. They are still striking at Nynex, and they failed to ratify the agreement negotiated with Pacific Telesis.

The CWA is scheduled to complete ratification votes on contracts with the Ameritech companies Oct. 6, and with Bell Atlantic Oct. 13. International Brotherhood of Electrical Workers members have ratified their contracts with Illinois Bell, Ameritech Services, Indiana Bell, Bell of Pennsylvania, New Jersey Bell and Pacific Bell Directories.

In terms of health care benefits, telcos that did not already have preferred provider option plans, established them, often at the union's suggestion. A PPO is an agreement with a group of physicians who agree to keep costs down because of anticipated usage.

Dental and vision benefit increases were common across the board, although the percentages vary. At most of the RHCs, eye exams will now be covered annually rather than every two years. New provisions for preventative medicine, such as mammograms and well-child care were also added in most of the contracts, as were new provisions

continued on page 12

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- 8 classes of toll restriction
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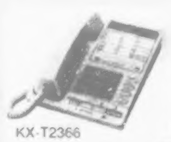
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Disagreement over the health care issue was a primary stumbling block in the negotiations that led to strikes at Nynex, Bell Atlantic and Pacific Telesis. Ameritech workers walked off the job in protest of wage proposals.

Nynex and the CWA and IBEW remain at odds over whether employees should contribute to the rising cost of health care through deductibles or premiums.

Ken Margolies, director of the labor program at Cornell University's New York City campus, said he was surprised but pleased that the unions have been able to avoid sharing in the cost of health care at most of the RHCs.

"The big story was health care," Margolies said. "It appears that there were no large shifts of cost to the worker.

"I was hopeful [the unions] would get a good agreement, but I was concerned it would be hard to hold the line on health care costs," he added. "I think it was quite an accomplishment given the climate of labor negotiations."

Margolies said health care will be "the issue of the '90s," in labor negotiations. "This was seen as pivotal. These negotiations were the first," he said.

In recognition of its importance, some RHCs followed the lead of AT&T and established joint union-management committees to study national solutions to the health care insurance problem. Bell Atlantic, BellSouth and U S West all established such committees.

Family care benefits, though not controversial like health care benefits, also were an important issue in the contract negotiations, and all of the RHCs again followed AT&T in agreeing to unprecedented benefits.

Union members will see increases from six months to one year for leaves of absence to care for newborn or adopted children. Medical coverage will be paid by the telcos for six months during leaves. And they all also adopted new one-year leaves of absence for union employees to care for elderly or seriously ill dependents.

Another ubiquitous benefit allows union employees to establish pre-tax accounts of up to $5000 to be used for dependent day-care. And virtually all of the settlements provide for reimbursement of up to $2000 for expenses incurred in adopting children.

Margolies said he thinks the CWA agreement with AT&T may have served as a model for the RHC agreements.

"The CWA is innovative and AT&T was maybe more willing than other employers to try out [family care benefits]," Margolies said. "[The RHCs] are image conscious and have a desire to be seen as caring and a part of the community."

In addition, women represent a large portion of CWA membership. "Women are moving [family] issues higher on the bargaining priority list," Margolies said.

Looking back at recent contract negotiations, industry experts agree that technological advances have made it difficult for workers to pressure telephone companies by threatening to strike.

Most of the strikes did not last long enough for customers to notice significant service disruption, and they did not last long enough for analysts to change their financial projections for the companies.

Ringling said that in general the strikes came at an optimal time for the telcos and they will not suffer financially because of the strikes.

But at Nynex, where workers have been on strike for more than two months, the story may be different.

"The company's earnings have been declining and will continue to do so unless it is able to get a hold on the cost situation," Ringling said, adding he believes the unions are going to have to contribute to the cost of health care for that to happen.

Nynex maintains that its union workers agreed three years ago to pay a $10.27-a-week deductible beginning July 1, 1989, but the unions say they did not agree that cost sharing would go into effect before the old contract ended.

Nynex recently offered to drop the deductible payment to $8 a week, but the unions refused the proposal.

"Nynex is going to be tough," Ringling said. "The unions are going to have to cough up some money." He said he believes union members will have to agree to pay about $7 a week.

Ringling said Nynex's "lackluster management" combined with the strength of the New York CWA and IBEW unions have fueled the strike there. The longer it goes on, he added, the more of a chance there is that customers will start noticing an adverse effect on service.

"Already when you walk down the street in New York, one of two pay phones doesn't work," Ringling said. T

Siemens marks millionth line

Siemens Public Switching Systems Inc. will celebrate the sale of its 1 millionth line of EWSD switching equipment in the U.S. this week.

Appropriately, the landmark purchase order came from Wisconsin Bell, which was the first Bell operating company to buy Siemens switches. The sale is a milestone in Siemens' efforts to crack the U.S. public switching market, which is dominated by AT&T and Northern Telecom. By contrast, Northern celebrated its 50 millionth line of DMS sales this summer.

The switch that put Siemens over the 1 million mark is a 32,000-line system, the largest of the 13 EWSDs installed in Ameritech territory. It will serve Sheboygan, Wis., beginning in mid-1990, and will be equipped to provide Centrex, signaling system 7 and integrated services digital network capabilities.

"We are pleased to have the order for our 1 millionth line from our old friends at Wisconsin Bell, and we're also acutely aware of the contributions that Bell Atlantic and our other customers have made to our success," said Volker Jung, president of Siemens Public Switching Sys-

continued on page 14

Jung